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Aerospace Medicine
and Biology
A Continuing
Bibliography
with Indexes

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September 1983

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BIOLOGY: A CONTINUING BIBLIOGRAPHY
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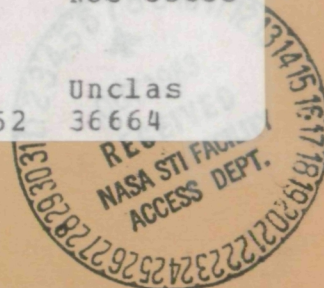
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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 249)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in August 1983 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*



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1983

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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 311 reports, articles and other documents announced during August 1983 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged by *STAR* categories 51 through 55, the Life Sciences division. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. The *IAA* items will precede the *STAR* items within each category.

Six indexes -- subject, personal author, corporate source, contract, report number, and accession number -- are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1983 Supplements.

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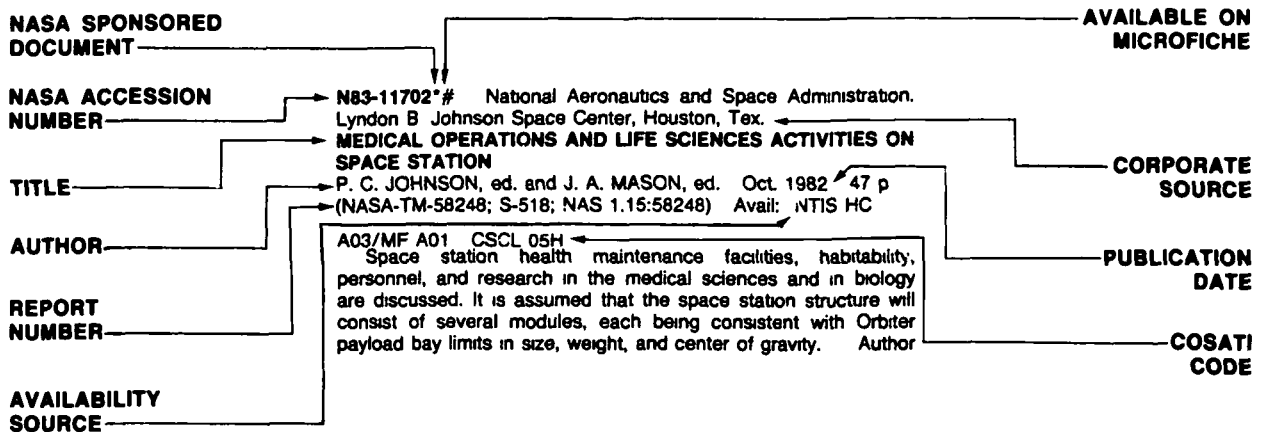
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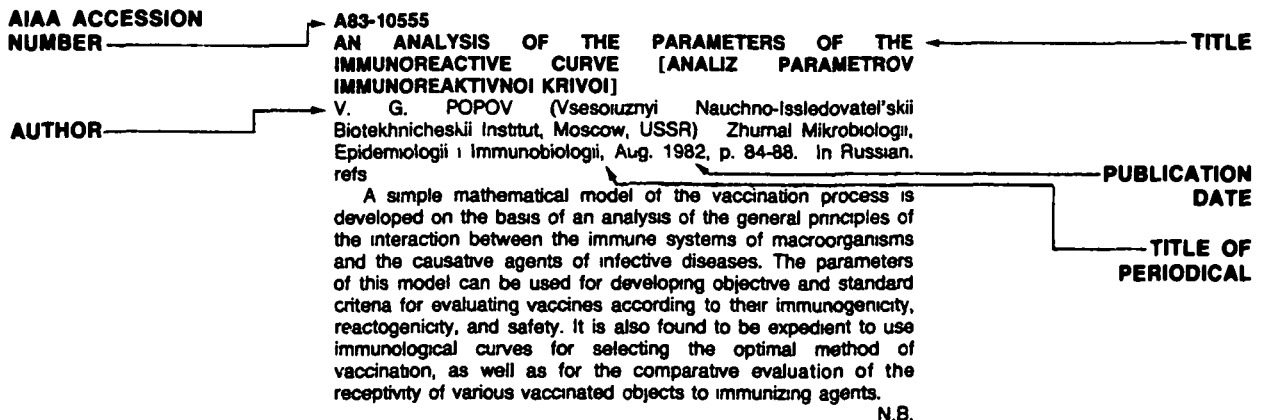
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AEROSPACE MEDICINE AND BIOLOGY

(A Continuing Bibliography (Suppl. 249))

SEPTEMBER 1983

51

LIFE SCIENCES (GENERAL)

Includes genetics.

A83-33542#

CHANGES OF SIDMAN AVOIDANCE BEHAVIOUR OF RATS INDUCED BY HYPOXIA

I. SAKURAI, E. SAKAGUCHI, H. OSADA, T. SAKAGUCHI, and A. NAKAMURA (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Tokyo, Japan) Japan Air Self-Defense Force, Aeromedical Laboratory, Reports (ISSN 0023-2858), vol. 23, Dec. 1982, p. 171-179. In Japanese, with abstract in English. refs

Alterations in the Sidman avoidance behavior of rats in hypoxic conditions were examined in bar pressing experiments. The rats were trained to avoid shock by pressing a bar, with the shocks coming either 15 or 5 sec apart. The oxygen levels of the enclosed atmosphere were then lowered to 10, 8 and 7 pct in various trials. Attention was also given to the resistance to extinction of the avoidance behavior during the hypoxic condition. Post-shock responses were found to disappear after the rats breathed the 7 pct O₂ mixture, although the response rates were maintained at higher O₂ concentrations. A decrease in extinction resistance was observed in all hypoxic simulations, independent of the oxygen concentrations. It is concluded that operant behavior is suppressed in rats in a hypoxic environment, although correct avoidance behavior is maintained in O₂ concentrations of 8 pct or higher.

M.S.K.

A83-33776

IONIZING RADIATION DECREASES VERATRIDINE-STIMULATED UPTAKE OF SODIUM IN RAT BRAIN SYNAPTOSOMES

H. N. WIXON and W. A. HUNT (U.S. Defense Nuclear Agency, Armed Forces Radiobiology Research Institute, Bethesda, MD) Science (ISSN 0036-8075), vol. 220, June 3, 1983, p. 1073, 1074. Research supported by the U.S. Defense Nuclear Agency. refs

A83-33801

OPTICS, THE EYE, AND THE BRAIN

L. A. RIGGS (Brown University, Providence, RI) Optical Society of America, Journal (ISSN 0030-3941), vol. 73, June 1983, p. 736-741. refs

A review is presented of recent research concerning the relationship of optics and vision. A brief discussion is given of the traditional links between optics and vision, focusing on the original unity of optics and vision, Kepler's studies of the optics of the eye, and the pathways from the eyes to the brain. Various recent trends in vision research are examined, including single-cell recording in the brain, the specialization of cortical cells, patterns of brain activity, sensory-motor control, perceptual plasticity, and information processing. Several possible future trends in vision research are identified, including the determination of the wiring diagrams of the retina, the identification of the chemistry of neural growth and transmitters, and the application of the mathematical framework of information theory to vision research.

N.B.

A83-34005

ENDOGENOUS OPIATES MEDIATE RADIOGENIC BEHAVIORAL CHANGE

G. A. MICKLEY, K. E. STEVENS (U.S. Air Force Academy, Colorado Springs, CO), G. A. WHITE, and G. L. GIBBS (Penrose Cancer Hospital, Colorado Springs, CO) Science (ISSN 0036-8075), vol. 220, June 10, 1983, p. 1185-1187. Research supported by the U.S. Defense Nuclear Agency and U.S. Air Force. refs

Exposure of C57BL/6J mice to ionizing radiation caused stereotypical locomotor hyperactivity similar to that produced by morphine. Naloxone administration prevented this radiation-induced behavioral activation. These results support the hypothesis that endorphins are involved in some aspects of radiogenic behavioral change.

Author

A83-34156* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

THE CHANGES IN LEAF REFLECTANCE OF SUGAR MAPLE (ACER SACCHARUM MARSH) SEEDLINGS IN RESPONSE TO HEAVY METAL STRESS

M. R. SCHWALLER, C. C. SCHNETZLER (NASA, Goddard Space Flight Center, Geophysics Branch, Greenbelt, MD), and P. E. MARSHALL (Michigan, University, Ann Arbor, MI) International Journal of Remote Sensing (ISSN 0143-1161), vol. 4, Jan-Mar. 1983, p. 93-100. Research supported by the University of Michigan and NASA. refs

The effects of heavy metal stress on leaf reflectance of sugar maple seedlings (*Acer saccharum* Marsh) are examined. It is found that sugar maple seedlings treated with anomalous amounts of heavy metals in the rooting medium exhibited an increased leaf reflectance over the entire range of investigated wavelengths, from 475 to 1650 nm. These results conform to those of a previous investigation in the wavelengths from 475 to 660 nm, but tend to contradict the previous study in the near infrared wavelengths from 1000 to 1650 nm. The differences may possibly be due to different water regimes in the two investigations. Previously announced in STAR as N81-29729.

M.G.

A83-34224

NITRATE RESPIRATION IN PRIMITIVE EUKARYOTES

B. J. FINLAY, A. S. W. SPAN, and J. M. P. HARMAN (Freshwater Biological Association, Ambleside, Cumb., England) Nature (ISSN 0028-0836), vol. 303, May 26, 1983, p. 333-336. refs

The *Loxodes* genus of Protozoa are shown to be capable of nitrate respiration due to dissimilatory nitrate reductase within the inner mitochondrial membrane. The vertical distribution of Protozoa was measured in the water of a pond in England. It was noted that the peaks in Protozoa concentration coincided with peaks in nitrite concentration and nitrate reductase activity. The peaks were always confined to anoxic water. The peaks were also associated with the presence of two species of *Loxodes*. Transmission electron microscopy of the bacteria revealed an increase in mitochondria compared to species living in an oxygenated medium. The increase was located in the area of cristae formed by infolding of the inner mitochondrial membrane. Production of laboratory-grown cultures of the anaerobic *Loxodes* demonstrated a production rate of reductase equal to that observed with the pond samples. It is suggested that the nitrate converting prokaryote ancestor of the mitochondria is the bacterium *Paracoccus denitrificans*.

M.S.K.

A83-34453

STATE OF THE KIDNEY AND BRAIN RENIN-ANGIOTENSIN SYSTEM (RAS) AND OF THE PITUITARY-ADRENAL AXIS IN RATS WITH ACUTE NEUROGENIC HYPERTENSION

T. G. DIMITROV (Meditsinska Akademiia, Sofia, Bulgaria) Bolgarskaia Akademiia Nauk, Doklady (ISSN 0366-8681), vol. 36, no. 3, 1983, p. 397-400. refs

A83-34871

A NEW CONCEPT OF RETINAL COLOUR CODING

W. PAULUS (Neurologische Universitätsklinik, Duesseldorf, West Germany) and A. KROEGER-PAULUS (Universitäts-Augenklinik, Duesseldorf, West Germany) Vision Research (ISSN 0042-6989), vol. 23, no. 5, 1983, p. 529-540. Sponsorship Deutsche Forschungsgemeinschaft. refs (Contract DFG-PA-267/1)

A theory of retinal color coding based closely on recent anatomical and physiological results is presented. Opponent color channels are shown to be an inevitable result of any randomly distributed retinal cone mosaic, the structure of red-green opponent color channels remaining uninfluenced by a predominance of 'red' or 'green' cones. These findings circumvent the conflict between anatomical results with more 'red' than 'green' cones and psychophysical estimations with more 'red' than 'green' cones. The effect of receptor compression and opponent color transformation on color perception is investigated. Non-opponency of pure green and pure red could be attributed to receptor compression, the Bezold-Bruecke phenomenon, however, to the antagonism of 'red' and 'green' cones within the receptive field surround of red-green opponent cells. The fundamental colors are estimated to be supersaturated violet, yellow-green and yellow-red.

Author

A83-34930

TOWARD A GENERAL THEORY OF ADAPTATION [K POSTROENIIU OBSHCHEI TEORII ADAPTATSII]

G. L. SHKORBATOV (Ivanovskii Gosudarstvennyi Universitet, Ivanovo, USSR) Zhurnal Obshchei Biologii (ISSN 0044-4596), vol. 43, Nov.-Dec. 1982, p. 775-787. In Russian. refs

The possibility of constructing a general theory of the adaptation of biological and nonbiological systems is discussed. The ability to adapt is considered one of the basic properties of living matter, inherent in all types of biological systems. The properties of stability, phase change pattern, and the minimization of functions are considered as prerequisites for the phenomenon of adaptation in systems of nonliving nature. A general determination of biological adaptation is presented. The principles of the classification of adaptations, natural selection in the development of the adaptive capability of biological systems, and the evolutionary role and consequences of the origin of several types of adaptations are examined.

N.B.

A83-34931

THE FUNCTION OF THE HYPOPHYSIAL-ADRENAL SYSTEM WHEN EXPOSED TO A VARIABLE MAGNETIC FIELD OF INDUSTRIAL FREQUENCY [FUNKTSIIA GIPOFIZARNO-NADPOCHECHNIKOVOI SISTEMY PRI RAZLICHNYKH REZHIMAKH VOZDEISTVIIA PEREMENNOGO MAGNITNOGO POLIA PROMYSHLENNOI CHASTOTY]

N. A. UDINTSEV and V. V. MOROZ (Tomskii Meditsinskii Institut, Tomsk, USSR) Gigiena Truda i Professional'nye Zabolovaniia, Dec. 1982, p. 54-56. In Russian. refs

Male white rats weighing 150-180 g are exposed to variable magnetic fields acting continuously and intermittently. Changes in the hypophysial-adrenal system are noted through comparisons with a control group. Brief exposure to the field is found to stimulate the system for a short time; with prolonged exposure to a continuous field, all links of the system manifest heightened activity. With prolonged exposure to an intermittent field, there is a decrease both in the corticotrophic function of the pituitary body and in the synthesis of steroidal hormones in the adrenal glands.

C.R.

A83-34933

THE DEPENDENCE OF THE BIOLOGICAL EFFECTS OF MICROWAVE IRRADIATION ON THE INTENSITY AND LENGTH OF EXPOSURE [ZAVISIMOST' BIOEFFEKTOV MIKROVOLNOVOGO OBLUCHENIIA OT INTENSIVNOSTI I DLITEL'NOSTI VOZDEISTVIIA]

E. A. LOBANOVA, I. P. SOKOLOVA, I. A. KITSOVSKAIA, N. B. RUBTSOVA, and E. K. LEBED (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Gigiena Truda i Professional'nye Zabolovaniia, Jan. 1983, p. 30-35. In Russian. refs

The biological effects on rats of microwave radiation in the 10-centimeter range with energy flux densities from 0.25-10 mW/sq cm and lengths of exposures from 25-240 minutes were investigated for total radiation exposures of 3 weeks-4 and 1/2 months. Parameters measured included the conditions of the central nervous system and the neuro-endocrine system, the immunological reactivity, and the embryogenesis. A direct relationship between the biological effects of microwave radiation and the radiation parameters is found. The results indicate that the link between the biological effects and the radiation parameters (intensity and duration) at energy flux densities less than 10 mW/sq cm is dose dependent.

N.B.

A83-34936

THE EFFECT OF PROLONGED ILLUMINATION OF THE RETINA OF A RABBIT WITH MONOCHROMATIC LIGHT ON ITS FUNCTIONAL CONDITION [VLIANIE DLITEL'NOGO OSVESHCHENIIA SETCHATKI GLAZA KROLIKA MONOKHROMATICHESKIM SVETOM NA EE FUNKTSIONAL'NOE SOSTOIANIE]

A. B. BUTMAN and O. A. MASLAKOV (Voenno-Meditsinskaiia Akademiia, Leningrad, USSR) Gigiena Truda i Professional'nye Zabolovaniia, Jan. 1983, p. 38-40. In Russian. refs

The effect of prolonged (45 min) multiple diffuse illumination of the rabbit retina with monochromatic light of the blue-green band of the spectrum on the functional condition of the retina is investigated. The patterns in the changes of the electroretinogram (ERG) b-wave amplitude following the illumination were measured. It was found that prolonged diffuse illumination can lead to significant steady inhibition of the functional condition of the peripheral region of the visual analyzer. The largest inhibition of the b-wave ERG amplitude of the rabbit retina was found to be 60 percent of the initial value 60-90 days after exposure. In addition, ERG inhibition up to 30 percent of the initial value could also be found in the eye not directly exposed to the diffuse illumination.

N.B.

A83-34937

THE DISTRIBUTION OF NA, K, CA, P, AND S IN THE VESTIBULAR APPARATUS AND EYE OF THE LARVAE OF THE FISH BRACHYDANIO RERIO [RASPREDELENIE NA, K, CA, P I S V VESTIBULIARNOM APPARATE I GLAZU LICHNOK RYBY BRACHYDANIO RERIO]

I. A. VINNIKOV, I. V. BUROVINA, F. G. GRIBAKIN, D. V. LYCHAKOV, B. L. ALLAKHVERDOV, and A. G. POGORELOV (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad; Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) Zhurnal Evoliutsionnoi Biokhimii i Fiziologii (ISSN 0044-4529), vol. 18, Nov.-Dec. 1982, p. 552-557. In Russian. refs

The distribution of Na, K, Ca, P, and S in the vestibular apparatus and eye of the larvae of Brachydanio rerio grown for 8 days onboard the Soiuz-22 biosatellite is investigated using X-ray microanalysis in order to study the effects of weightlessness on the ion metabolism in the organs of sensation. Results show a positive correlation between the concentration of K and P in the cells. The endolymph of larvae contain much K and Na but little S, while the otolith is fully calcified and contains some Na and S. The distribution of Na, K, Ca, P, and S in the retina of fish larvae is similar to that found in the retina of frogs. A lower concentration of K and a slightly lower concentration of P are observed in the outer segments in comparison with the nuclear layers. A high concentration of S is found in the photoreceptors and in the inner

retinal layer The pigmented layer of the retina is found to contain K, Ca, and Na. The crystalline lens contains a high S concentration, while the epithelial cells of the crystalline lens contain more K, P, and Na than the crystalline fibers N B

A83-34940

THE PROBLEM OF MICROCIRCULATION AND EYE PATHOLOGY [PROBLEMA MIKROTSIRKULIATSII I PATOLOGIJA GLAZA]

L. T. KASHINTSEVA (Odesskii Nauchno-Issledovatel'skii Institut Glaznykh Boleznii i Tkanevoi Terapii, Odessa, Ukrainian SSR) *Oftalmologicheskii Zhurnal* (ISSN 0030-0675), vol. 37, no. 8, 1982, p. 453-457. In Russian. refs

A review is presented of research concerning the structure of the microcirculatory bed of the eye and its connection with various types of eye pathologies. Attention is given to the microhemocirculation part of the system, including an examination of its functions and the mechanism of its disorders in various diseases and during aging. The condition and role of the microcirculatory bed of the eye in various eye pathologies are discussed. It is shown that the condition of the microhemocirculation bed of the conjunctiva can provide information about the condition of the microhemocirculatory bed as a whole. The use of fluorescent angiography for determining the condition of the microcirculatory bed of the eye in normal individuals and in patients with various types of eye pathologies is considered. N B

A83-34942

THE CONTENT OF BIOELEMENTS IN THE TISSUES DURING THE AGING OF AN ORGANISM (REVIEW OF THE LITERATURE) [SODERZHANIE BIOELEMENTOV V TKANIAXH PRI STARENII ORGANIZMA /OBZOR LITERATURY/]

V. I. ZAPADNIUK and S. A. ORANSKAIA (Akademiia Meditsinskikh Nauk SSSR, Kiev, Ukrainian SSR) *Vrachebnoe Delo* (ISSN 0049-6804), Dec. 1982, p. 3-8. In Russian. refs

A83-34958

HEART FUNCTION AND CERTAIN MECHANISMS FOR ITS REGULATION WHEN SIMULATING THE ADAPTATION TO HYPOXIA BY ADMINISTERING 2,4-DINITROPHENOL [FUNKTSIIA SERDTSA I NEKOTORYE MEKHANIZMY EE REGULIATSII PRI MODELIROVANII ADAPTATSII K GIPOKSII VVEDENIEM 2,4-DINITROFENOLA]

A. I. IVANOV and N. K. KHITROV (I Moskovskii Meditsinskii Institut, Moscow, USSR) *Kardiologiya* (ISSN 0022-9040), vol. 23, Jan. 1983, p. 94-98. In Russian. refs

The possibility of stimulating adaptation to hypoxia under the effect of an energy deficiency induced by 2,4-dinitrophenol is investigated, along with the effects of a single administration and of prolonged administration of this substance on the function and sympathetic regulation of the heart. It is found that with moderate energy deficiency, the increase in the sympathetic action on the heart is accompanied by an increased supply of noradrenaline and by a weakening in the reaction of the cardiovascular system to additional humoral and reflex actions. This weakened reaction works to stabilize the hyperfunction of the myocardium. C.R.

A83-34960

THE ROLE OF ADRENERGIC MECHANISMS IN THE DEVELOPMENT OF CEREBROVASCULAR DISORDERS DURING ACUTE MYOCARDIAL ISCHEMIA [ROL' ADRENERGICHESKIKH MEKHANIZMOV V RAZVITII TSEREBROVASKULIARNYKH NARUSHENII PRI OSTROI ISHEMII MIOKARDA]

L. G. MILLER (Irkutskii Meditsinskii Institut, Irkutsk, USSR) *Biulleten' Eksperimental'noi Biologii i Meditsiny* (ISSN 0006-4041), vol. 94, Dec. 1982, p. 9-11. In Russian. refs

A83-34961

A CHOLINERGIC MECHANISM FOR THE REGULATION OF THE CARDIAC FUNCTION DURING ACUTE TRANSITORY CORONARY INSUFFICIENCY [KHOLINERGICHESKII MEKHANIZM REGULIATSII FUNKTSII SERDTSA PRI OSTROI TRANZITORNOI KORONARNOI NEDOSTATOCHNOSTI]

P. F. LITVITSKII (I Moskovskii Meditsinskii Institut, Moscow, USSR) *Biulleten' Eksperimental'noi Biologii i Meditsiny* (ISSN 0006-4041), vol. 94, Dec. 1982, p. 12-15. In Russian. refs

A83-34962

THE EFFECT OF STRESS ON THE EXTENSIBILITY AND THE CONTRACTILE FUNCTION OF THE MYOCARDIUM [VLIANIE STRESSA NA RASTIAZHIMOST' I SOKRATITEL'NUIU FUNKTSIIU MIOKARDA]

M. G. PSHENNIKOVA, E. IA. VORONTSOVA, and F. Z. MEERSON (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Biulleten' Eksperimental'noi Biologii i Meditsiny* (ISSN 0006-4041), vol. 94, Dec. 1982, p. 15-17. In Russian. refs

The effect of emotional and painful stress on the myocardial extensibility and contractile function was studied in the isolated rat atrium. Emotional and painful stress was administered to the rats for a single 6-hr period according to the method of Desiderato et al. (1974), and the myocardial extensibility and contractile function of the isolated atrium were determined. Results show that emotional and painful stress induces a decrease in the myocardial extensibility and contractile function. It was found that Starling's curve was depressed and the efficiency of Starling's mechanism was decreased after emotional and painful stress. It is concluded that these changes were due to the failure of the energy supply and calcium transport systems in cardiomyocytes induced by stress. N B

A83-34963

THE CIRCADIAN RHYTHM OF LIVER PHOSPHOLIPIDS IN NORMAL GOLDEN HAMSTERS AND IN THOSE WITH OPISTHORCHIASIS [SUTOCHNYI RITM FOSFOLIPIDOV PECHENI ZOLOTISTOGO KHOMIACA V NORME I PRI OPISTORCHOZE]

A. G. GINOVKER and A. I. ZHIKHAREVA (Tiumenskii Meditsinskii Institut, Tyumen, USSR) *Biulleten' Eksperimental'noi Biologii i Meditsiny* (ISSN 0006-4041), vol. 94, Dec. 1982, p. 45-48. In Russian. refs

A83-34964

THE TURNOVER OF MITOCHONDRIAL PROTEINS IN THE LIVERS OF RATS OF VARIOUS AGES [OBNOVLENIE MITOKHONDRIAL'NYKH BELKOV V PECHENI KRYSA RAZNOGO VOZRASTA]

A. IA. LITOSHENKO (Akademiia Meditsinskikh Nauk SSSR, Kiev, Ukrainian SSR) *Biulleten' Eksperimental'noi Biologii i Meditsiny* (ISSN 0006-4041), vol. 94, Dec. 1982, p. 49-51. In Russian. refs

The effect of age on the turnover of mitochondrial proteins in the livers of full-grown (7 months old) and old (28 months old) rats was investigated. Results indicate a decline during aging of the turnover rate of mitochondrial proteins which are synthesized in the mitochondrial ribosomes and enter into the composition of the mitochondrial membranes. This decline is noted in both mitochondrial fractions and does not characterize 'old' mitochondria, but is a characteristic of the aging of the organism. It is concluded that the mitochondria does not turnover as a whole organelle, especially during late stages of ontogenesis, and that the energetic insufficiency of old organisms is caused by changes in the metabolism of proteins coded for by the mitochondrial genome. N B

A83-34965

THE COMPLEMENT-FIXING CAPABILITY OF AGGREGATED IMMUNOGLOBULINS WITH VARIOUS MOLECULAR WEIGHTS [KOMPLEMENTSVIAZYVAIUSHCHAIYA SPOSOBNOST' AGREGIROVANNYKH IMMUNOGLOBULINOV RAZLICHNYKH MOLEKULIARNYKH MASS]

N. A. KONSTANTINOVA, K. K. OSTREIKO, I. A. TUMANOVA, V. V. LAVRENTEV, and R. V. PETROV *Biulleten' Eksperimental'noi Biologii i Meditsiny* (ISSN 0006-4041), vol. 94, Dec 1982, p 73-75. In Russian. refs

A83-34966

AN ULTRASONIC INVESTIGATION OF THE BLOOD FLOW IN VARIOUS PARTS OF THE VASCULAR BED OF THE LUNGS OF CATS [IZUCHENIE KROVOTOKA V RAZNYKH OTDELAKH SOSUDISTOGO RUSLA LEGKIKH KOSHKI S POMOSHCH'IU UL'TRAZVUKA]

N. V. SANOTSKAIA and D. D. MATSIEVSKII (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Biulleten' Eksperimental'noi Biologii i Meditsiny* (ISSN 0006-4041), vol. 94, Dec. 1982, p 119-122. In Russian refs

A83-34967

SOME RESULTS OF STUDIES OF THE EFFECT OF WEIGHTLESSNESS ON THE GROWTH OF AN EPIPHYTIC ORCHID [DEIAKI REZUL'TATI DOSLIDZEN' VPLIVU NEVAGOMOSTI NA RIST EPIFITNOI ORKHIDEI]

T. M. CHEREVCHENKO and T. K. MAIKO *Akademiia Nauk Ukrain's'koi RSR, Visnik* (ISSN 0372-6436), vol. 47, Jan. 1983, p. 31-35. In Ukrainian refs

A83-34975

MORPHOLOGICAL FEATURES AND CERTAIN REPRESENTATIONS OF THE MECHANISM FOR THE BIOLOGICAL EFFECT OF MAGNETIC FIELDS [MORFOLOGICHESKIE OSOBENNOSTI I NEKOTORYE PREDSTAVLENIIA O MEKhanizME BIOLOGICHESKOGO DEISTVIA MAGNITNYKH POLEI]

I. V. TOROPTSEV (Tomskii Meditsinskii Institut, Tomsk, USSR) and S. V. TARANOV (Akademiia Meditsinskikh Nauk SSSR, Tomsk, USSR) *Arkhiv Patologii* (ISSN 0004-1955), vol. 44, no. 12, 1982, p 3-11 In Russian. refs

An analysis of experimental data and data in the literature carried out at the level of both organisms and cells establishes the extreme sensitivity of organisms to magnetic fields. The way in which an organism responds is found to depend greatly on the functional state of the organism. The field's biotropic parameters determine how pronounced the effect is. The effect, however, does not manifest itself in a specific set of morphological changes. The changes are not the same in all tissues, and they depend on features of metabolism, structure, and function. In the early stages, the morphological and functional changes are actually adaptations to preserve homeostasis. The mechanism underlying the response to magnetic fields is believed to have three aspects. The first is a quantum-biochemical interaction between the field and a biological substrate; the second is the reception by the organism of the result of the field's action; and the third is the response to this action

C.R

A83-34986

RESULTS OF OUR 15-YEAR STUDY INTO THE BIOLOGICAL EFFECTS OF MICROWAVE EXPOSURE

Z. DJORDJEVIC, A. KOLAK, V. DJOKOVIC, P. RISTIC, and Z. KELECEVIC (Institute of Aviation Medicine, Zemun, Yugoslavia) *Aviation, Space, and Environmental Medicine* (ISSN 0095-0562), vol. 54, June 1983, p. 539-542. refs

Results of clinical and experimental research are presented concerning the biological effects of microwave exposure. Among other general results, it was found that the effects of microwave radiation, either direct or indirect, are the consequence of local or general hyperthermia. Pathological effects of microwave radiation were found only when exposure in the microwave field was followed by regional or general increase in the body temperature of

experimental animals. Prolonged exposure of experimental animals to high-intensity microwave radiation (over 200 mW/sq cm) was found to cause different thermal injuries of tissues and, depending on the applied dose of radiation, led to death immediately from hyperthermia. However, exposure of small experimental animals to low-intensity microwave radiation (lower than 5 mW/sq cm) did not cause thermoregulation disorders or local thermal effects. In addition, no significant functional or organic changes have been observed in individuals professionally exposed to low intensity microwave radiation.

N.B

A83-35609

LIFE SCIENCE RESEARCH ON-BOARD SPACELAB. I - THE SPACELAB SYSTEM

M. J. F. FOWLER (Royal Free Hospital, London, England) *British Interplanetary Society, Journal (Space Chronicle)* (ISSN 0007-084X), vol. 36, June 1983, p. 243-248. refs

The design and objectives of Spacelab, the ESA/NASA science module to be used with the Space Shuttle beginning in September, 1983, are reviewed with a focus on biological and medical projects. The advantages of a true laboratory environment and direct, flexible manipulation of materials over the automated self-contained experiment packages previously deployed are discussed. The facilities available in each of the Spacelab's module/pallet configurations are presented, and environmental-control and data-management systems outlined. Experiments planned for Spacelab-1 include studies of the effects of prolonged weightlessness (on the humoral immune response of humans, on lymphocyte proliferation, on erythrokinetics, on mass discrimination, on the measurement of central-venous pressure and serum hormone levels, on the nutation of *Helianthus annuus*, and on three-dimensional ballistocardiography), observations of microorganisms and biomolecules in hard space environment, and testing of a personal miniature electrophysiological tape recorder.

T.K.

A83-35919

STRONGLY ACIDIC POLYPEPTIDES AS INHIBITORS OF THE REPAIR OF SINGLE-STRAND DNA BREAKS CAUSED BY GAMMA-IRRADIATION [SIL'NOKISLYE POLIPEPTIDY KAK INGBITORY REPARATSII ODNONITEVYKH RAZRYVOV DNK, VYZVANNYKH GAMMA-OBLUCHENIEM]

A. I. MEDVEDEV, G. I. REVINA, and A. M. KUZIN (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) *Akademiia Nauk SSSR, Doklady* (ISSN 0002-3264), vol. 270, no. 1, 1983, p. 232-235. In Russian. refs

A83-35920

ULTRAVIOLET-IRRADIATED BLOOD - PHOTOCHEMISTRY, IMMUNOLOGICAL ACTION [OBLUCHENNAIA UL'TRAIOLETOVYM SVETOM KROV' - FOTOKHIMIIA, IMMUNOLOGICHESKOE DEISTVIE]

V. A. KRYLENKOV, L. M. KUKUI, A. M. MALYGIN, M. A. OSMANOV, A. F. SHAPKIN, and V. E. KHOLMOGOROV (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) *Akademiia Nauk SSSR, Doklady* (ISSN 0002-3264), vol. 270, no. 1, 1983, p. 242-246. In Russian. refs

The effect of ultraviolet radiation on human blood is investigated, focusing on studies of the photochemical reactions in blood plasma, the immune responses of humans to reinfused UV-irradiated blood, and the alterations in the blood cell surfaces caused by UV irradiation. Results show that in the course of the photoreactions and the dark chemical reactions, the blood plasma proteins undergo photodestruction with the formation of biologically active fragments of protein molecules, polypeptides, and low molecular-weight compounds. The UV-irradiation of whole blood and the reinfusion of this blood into the body of the donor is accompanied by marked changes in the sensibilization level of lymphocytes to normal tissue antibodies, which are greatest 4-8 days after the reinfusion of the UV-irradiated blood. The agglutination reaction of UV-irradiated human erythrocytes have higher titers of alpha beta-agglutinins than in the controls.

N.B.

A83-35921

THE BIOLOGICAL EFFECT OF THE ELECTRIC COMPONENT OF AN ELECTROMAGNETIC FIELD IN THE VLF RANGE [BIOLOGICHESKOE DEISTVIE ELEKTRICHESKOI SOSTAVLIAIUSHCHEI ELEKTROMAGNITNOGO POLIA SVERKHDLINNOVOL'NOVOGO DIAPAZONA]

V. V. ANTIPOV, N. N. DOBROV, V. A. KOZLOV, M. D. NIKITIN, and L. A. SEMENOVA Akademii Nauk SSSR, Izvestia, Seria Biologicheskaya (ISSN 0002-3329), May-June 1983, p. 419-425. In Russian. refs

The biological effects of the electric component of an electromagnetic field in the VLF range (15 kHz at a strength of 1 and 2 kV/m) for prolonged times of exposure (2 and 10 days) were investigated in experiments using guinea pigs, white rats, and mice. Factors studied include the changes in indicators of the blood, especially leukocytes and thrombocytes, the increase in the swimming time of mice in the early periods after exposure to the electric component of an electromagnetic field at 1 kV/m; the aggravation of the radiation leukopenia and the decrease of the radiation protection effectiveness of cystamine during the combined effects of the electric components of an electromagnetic field and gamma-radiation; and shifts in the functional condition of the higher sections of the central nervous system. Among other results, it was found that the character of the response reaction of the animals to the action of the electric component of an electromagnetic field depended on the field strength. N.B.

A83-35922

THE RECOVERY OF TEMPERATURE HOMEOSTASIS OF MAMMALS UNDER MICROWAVE IRRADIATION [VOSTANOVLENIE TEMPERATURNOGO GOMEOSTAZISA MLEKOPITAISHCHIKH PRI MIKROVOLNOVOM OBLUCHENII]

V. A. SHESTIPEROV Akademii Nauk SSSR, Izvestia, Seria Biologicheskaya (ISSN 0002-3329), May-June 1983, p. 426-431. In Russian

A theoretical analysis is presented of the changes, averaged by body weight, of the temperature of mammals which can be used to determine the temperature changes both at the time of microwave irradiation and in the interval between radiation exposures, as well as after a double exposure to radiation at a prescribed interval. Expressions are obtained for determining the recovery period according to the prescribed effect of recovery at the end of a repeated irradiation, as well as for the period of the full recovery of temperature homeostasis. It is shown that the theoretical model accurately describes the experimental results of the recovery reactions of mammals and allows indicators of active heat diffusion to be determined based on experimental data. N.B.

A83-35923

THE NEUROPHYSIOLOGICAL BASES OF NARCOSIS - THE GENERAL AND SELECTIVE EFFECTS OF NARCOTIC SUBSTANCES ON THE NEURONAL STRUCTURES OF THE CENTRAL NERVOUS SYSTEM [NEIROFIZIOLOGICHESKIE OSNOVY NARKOZA - OBSHCHEE I IZBIRATEL'NOE VLIANIE NARKOTICHESKIKH VESHCHESTV NA NEIRONAL'NYE STRUKTURY TSNS]

N. V. DMITRIEVA, A. M. MATESHA, and I. V. IVANOVA (Nauchno-Issledovatel'skii Institut po Biologicheskim Ispytaniyam Khimicheskikh Soedinenii, Moscow, USSR) Akademii Nauk SSSR, Izvestia, Seria Biologicheskaya (ISSN 0002-3329), May-June 1983, p. 432-439. In Russian. refs

A83-35924

THE BIOLOGICAL ACTIVITY OF LUNAR SOIL FROM MARE FECUNDITATIS DURING INTRATRACHEAL INJECTION [K VOPROSU O BIOLOGICHESKOI AKTIVNOSTI LUNNOGO GRUNTA IZ MORIA IZOBILIIA PRI INTRATRAKHEAL'NOM VVEDENII]

V. I. BELKIN, V. V. KUSTOV, M. K. KULAKOVA, and E. F. PANCHENKOVA Akademii Nauk SSSR, Izvestia, Seria Biologicheskaya (ISSN 0002-3329), May-June 1983, p. 461-465. In Russian. refs

The biological effects of lunar soil (regolith) from Mare Fecunditatis were studied in white rats after intratracheal injection. Rats were injected with 50 mg of lunar dust in a starch solution, 50 mg of SiO₂, or with starch alone each month for a total of 6 months. Results show that the lunar soil exhibits a moderate level of fibrogenic activity, which is evoked by its specific action on the morphological structure of the respiratory and nonrespiratory areas of the lungs. However, this effect is less than the harmful effects of that caused by SiO₂. In addition, the maximum deleterious effects of lunar soil occurred in the first 3 months of the experiment, while the effects of SiO₂ increased during the 6 months of the experiment. It is concluded that these effects are due to the various physical and mechanical properties of the particles of lunar soil and SiO₂. N.B.

A83-35925

THE EFFECT OF A CONSTANT HIGH-STRENGTH MAGNETIC FIELD ON SPERMATOGENESIS IN MAMMALS [VLIANIE POSTOIANNYKH MAGNITNYKH POLEI VYSOKOI NAPRIAZHENNOSTI NA SPERMATOGENEZ MLEKOPITAISHCHIKH]

A. D. STRZHIZHOVOSKII (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) and V. M. MASTRIUKOVA Akademii Nauk SSSR, Izvestia, Seria Biologicheskaya (ISSN 0002-3329), May-June 1983, p. 473-475. In Russian. refs

A83-35992

GROWTH OF 'BLACK SMOKER' BACTERIA AT TEMPERATURES OF AT LEAST 250 C

J. A. BAROSS (Oregon State University, Corvallis, OR) and J. W. DEMING (Johns Hopkins University, Shadyside, MD, Nature (ISSN 0028-0836), vol. 303, June 1983, p. 423-426. refs (Contract N00014-79-C-0004)

It is reported that a bacterial community originally cultured from 306 C water is capable of chemolithotrophic growth in a titanium growth chamber under in situ vent pressure of 265 atm and at temperatures of at least 250 C. Growth curves of the community and associated increases in total protein are shown for temperatures of 150 C, 200 C, 250 C, and 300 C. An amino acid analysis of total protein from a 6 hr culture at 250 C and 265 atm pressure is presented. Transmission electron microscopy of thin sections of these bacteria has revealed the presence of at least two morphologically distinct organisms. These results substantiate the hypothesis that microbial growth is limited not by temperature but by the existence of liquid water. C.D.

A83-35998

CONTROLLING THE DURATION OF PHOTOSYNTHETIC CHARGE SEPARATION WITH MICROWAVE RADIATION

M. R. WASIELEWSKI, C. H. BOCK, M. K. BOWMAN, and J. R. NORRIS (Argonne National Laboratory, Argonne, IL) Nature (ISSN 0028-0836), vol. 303, June 9, 1983, p. 520-522. refs (Contract W-31-109-ENG-38)

It is shown how microwave-induced strong internal magnetic field perturbation can be used to control the lifetime of an initially formed radical ion pair. Radical pair lifetimes are plotted against magnetic field for reaction centers from the R-26 mutant of the photosynthetic bacterium *R. sphaeroides*, and lifetime detected magnetic resonance spectrum for the same ion radical group is shown. The lifetime of the population increases with increasing magnetic field by about 25 percent and decreases with resonance at moderate powers. The effects of resonance and magnetic field

on the mixture of subpopulations in the radical pair population are described
C.D.

A83-36017* Ohio State Univ., Columbus
REVERSIBLE LOSS OF GRAVITROPIC SENSITIVITY IN MAIZE ROOTS AFTER TIP APPLICATION OF CALCIUM CHELATORS
J. S. LEE, T. J. MULKEY, and M. L. EVANS (Ohio State University, Columbus, OH) Science (ISSN 0036-8075), vol. 220, June 24, 1983, p. 1375, 1376. Research supported by the Korea National Science and Engineering Foundation refs
(Contract NAGW-297; NSF PCM-81-03298)

The application of calcium chelating agents (EDTA or EGTA) to the tips of maize roots caused a loss of gravitropic sensitivity. When the chelator was replaced with calcium chloride, gravitropic sensitivity was restored. Asymmetric application of calcium chloride near the tip of a vertical root caused curvature toward the calcium source. When the calcium was applied to the upper surface of the tip of a root oriented horizontally, the root curved upward even though control roots exhibited strong downward curvature. Application of calcium chloride to the tips of decapped roots, which are known to be gravitropically insensitive, did not restore gravitropic sensitivity. However, asymmetric application of calcium chloride near the tips of decapped roots caused curvature toward the calcium source. Calcium may play a key role in linking gravity detection to gravitropic curvature in roots. Author

A83-36719* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
HYPERTHERMIC RESPONSES TO CENTRAL INJECTIONS OF SOME PEPTIDE AND NON-PEPTIDE OPIOIDS IN THE GUINEA-PIG

S. B. KANDASAMY and B. A. WILLIAMS (NASA, Ames Research Center, Biosystems Div., Moffett Field, CA) Neuropharmacology (ISSN 0028-3908), vol. 22, no. 5, 1983, p. 621-628 refs

The intracerebroventricular administration of prototype nonpeptide opioid receptor (μ , κ , and σ) agonists, morphine, ketocyclazocine, and N-allyl normetazocine and an agonist at both κ and σ receptors, pentazocine, was found to induce hyperthermia in guinea pigs. The similar administration of peptide opioids like beta endorphin, methionine endkephalin, leucine endkephaline, and several of their synthetic analogues was also found to cause hyperthermia. Only the liver-like transport system of the three anion transport systems (iodide, hippurate, and liver-like) present in the choroid plexus was determined to be important to the central inactivation of beta-endorphin and two synthetic analogues. Prostaglandins and norepinephrine (NE) as well as cAMP were not involved in peptide and nonpeptide opioid-induced hyperthermia. Naloxone-sensitive receptors were found to be involved in the induction of hyperthermia by morphine and beta-endorphin, while hyperthermic responses to ketocyclazocine, N-allyl normetazocine, pentazocine, Met-enkephalin, Leu-enkephalin, and two of the synthetic analogues were not antagonized by naloxone. The lack of antagonism of naloxone on pyrogen, arachidonic acid, PGE₂, dibutyryl cAMP, and NE-induced hyperthermia shows that endogenous opioid peptides are not likely to be central mediators of the hyperthermia induced by these agents. N.B.

A83-36802
A THRESHOLD MOLECULAR QUANTUM REGULATOR [PREDEL'NYI MOLEKULIARNYI KVANTOVYI REGULIATOR]

E. A. LIBERMAN (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) Biofizika (ISSN 0006-3029), vol. 28, Jan.-Feb. 1983, p. 183-185. In Russian. refs

It is proposed that a quantum molecular regulator can be found in cells which controls the permeability of the surface membrane from within the cell and functions as an analog diffusion calculating system. This regulator requires elements with molecular sizes of approximately 100 Å which can generate hypersound signals and these signals are capable of shifting the probability of protons in these structures. Acoustic waves are necessary instead of electromagnetic waves since electromagnetic waves at a wavelength of 100 Å have a large energy and would destroy the molecular

elements of the system. Evidence is presented which shows that this threshold molecular quantum regulator functions in the living cell. N.B.

A83-36803
AN X-RAY INVESTIGATION OF THE DEPENDENCE ON PH OF THE STRUCTURE OF THICK FILAMENTS IN DEMEMBRANIZED FIBER BUNDLES OF SKELETAL MUSCLES IN VERTEBRATES [RENTGENOGRAFICHESKOE IZUCHENIE ZAVISIMOSTI OT PH STRUKTURY TOLSTYKH NITEI V DEMEMBRANIZIROVANNYKH PUCHKAKH VOLOKON SKELETNYKH MYSHTZ POZVONOCNOYKH]

V. V. LEDNEV, A. N. KORNEV, and L. K. SREBNITSKAIA (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) Biofizika (ISSN 0006-3029), vol. 28, Jan.-Feb. 1983, p. 96-99. In Russian. refs

A83-36804
INSTABILITIES OF AUTOWAVES IN EXCITABLE MEDIA CONNECTED WITH THE PHENOMENON OF CRITICAL CURVATURE [NEUSTOICHIVOSTI AVTOVOLN V VOZBUDIMYKH SREDAKH, SVIAZANNYE S IAVLENIEM KRITICHESKOI KRIVIZNY]

A. M. PERTSOV, A. V. PANFILOV, and F. U. MEDVEDEVA (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino, USSR) Biofizika (ISSN 0006-3029), vol. 28, Jan.-Feb. 1983, p. 100-102. In Russian. refs

A new type of instabilities which has no analog in one-dimensional systems was found during studies of a two-dimensional excitable medium described by the Fitz-Hugh equation. It is shown that when the wave encounters an obstacle, a break in the wave front is formed and the wave diverges, leading to the destruction of the excitation waves. The origin of such instabilities is connected with the phenomenon of critical curvature. The instabilities occur when the curvature of the front in the region of the wave break is larger than the value of the critical curvature for the given medium. It is proposed that these instabilities may be observed during the suppression of excitable media, including the processes which occur in the damaged regions of myocardial tissue. N.B.

A83-36805
THE EFFECT OF THE KINETICS OF ERYTHROCYTE DESTRUCTION ON THE DYNAMIC BEHAVIOR OF THE ERYTHROPOIESIS SYSTEM [VLIYANIE KINETIKI RASPAD ERYTROTZITOV NA DINAMICHESKOE POVEDENIE SISTEMY ERYTROPOEZA]

M. N. FLEROV and B. F. DIBROV (Nauchno-Issledatel'skii Institut po Biologicheskim Ispytaniyam Khimicheskikh Soedinenii, Kupavna, USSR) Biofizika (ISSN 0006-3029), vol. 28, Jan.-Feb. 1983, p. 103-107. In Russian. refs

A simple mathematical model of the regulation of the number of erythrocytes is utilized to study the effect of the cell destruction kinetics on the dynamic behavior of the erythropoiesis system. The effects of two reasons for the destruction of erythrocytes are examined: random destruction and the destruction of cells at a determined age (aging). It is shown that the most widely used models for the destruction of erythrocytes as a purely random process lead to a significant increase in the stability of the system (about a three-fold increase in the value of the critical coefficient of feedback). The possibilities of oscillations with large periods (20-200 days) in the system are examined. N.B.

A83-36806
AN IONIC MECHANISM OF THE WOODWORS STAIRCASE [IONNYI MEKHANIZM LESTNITSY VUDVORSA]

M. P. MUKUMOV, V. A. PAUTOV, S. A. ISAEVA, and L. V. SOROKIN (Nauchno-Issledovatel'skii Institut po Biologicheskim Ispytaniyam Khimicheskikh Soedinenii, Kupavna, USSR) Biofizika (ISSN 0006-3029), vol. 28, Jan.-Feb. 1983, p. 108-113. In Russian. refs

An analysis is presented for the single-chamber model of the electromechanical coupling in myocardial cells. It is shown that

the Woodwors staircase may be modeled in two situations when the stationary input current of $\text{Ca}(2+)$ significantly exceeds the potential-dependent uptake of $\text{Ca}(2+)$ into the cell through the sarcolemma and when the action potential is abruptly shortened with an increase in the frequency of myocardial stimulation. The results of experiments conducted on portions of the heart ventricle of frogs support the conclusions of the model. Blocking the Ca -channels with nifedipine (10 to the -6th g/mole) on a background of isotonic substitution of 70 percent of the NaCl leads to the development of the Woodwors staircase with an increased rhythm of stimulation. The abruptly shortening action potential after rest during the combined action of adrenaline (10 to the -6th g/mole) and D-600, a blocking agent for Ca -channels, (10 to the -6th g/mole) acts to invoke the Woodwors staircase

N.B.

A83-36807

THE RECOVERY OF THE WEIGHTING FUNCTIONS OF SIMPLE FIELDS OF THE VISUAL CORTEX WITH REGARD TO NONLINEARITY [VOSSTANOVLENIE VESOVYKH FUNKTSII PROSTYKH POLEI ZRITEL'NOI KORY S UCHETOM NELINEINOSTI]

I. A. BEDROV and A. I. PANIN (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) *Biofizika* (ISSN 0006-3029), vol. 28, Jan-Feb. 1983, p. 114-118. In Russian.

A83-36808

THE INDUCTION OF CIRCADIAN RHYTHM BY LIGHT IMPULSES - THE DEPENDENCE ON ILLUMINATION AND DURATION OF THE IMPULSE [INDUKTSIIA SUTOCHNOGO RITMA SVETOVYM IMPUL'SOM: ZAVISIMOST' OT OSVESHCHENNOSTI I PRODOLZHITEL'NOSTI IMPUL'SA]

V. B. CHERNYSHEV (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) *Zhurnal Obshchei Biologii* (ISSN 0044-4596), vol. 44, Jan.-Feb. 1983, p. 43-50. In Russian. refs

It is shown that the rhythm of the eclosion of drosophila from pupae in constant darkness can be induced by a single light impulse. The accuracy of the induced rhythm is gradually increased with increasing levels of illumination up to 5000 and of duration of the light impulse up to 12 hours. The further increase of these parameters leads to a decrease in the accuracy of the rhythm. The position of the phase of the rhythm also depends on the illumination and the duration of the impulse. These results are in opposition to the current ideas concerning both the simple threshold role of illumination in the regulation of the rhythms and the energetic effect of a light impulse on the rhythm. The action of a light impulse increases when the impulse parameters approach the conditions natural for the given species.

N.B.

A83-36809

MECHANISMS OF DEFENSE AGAINST THE TOXIC ACTION OF OXYGEN AND METHODS FOR THE UTILIZATION OF THE REACTIVE FORMS OF OXYGEN IN LIVING SYSTEMS [MEKHANIZMY ZASHCHITY OT TOKSICHNOGO DEISTVIIA KISLORODA I SPOSOBY ISPOL'ZOVANIIA REAKTIVNYKH FORM KISLORODA V ZHIVYKH SISTEMAKH]

O. I. IANKOVSKII (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) *Zhurnal Obshchei Biologii* (ISSN 0044-4596), vol. 44, Jan.-Feb. 1983, p. 62-70. In Russian. refs

A review is presented of recent research concerning the nature of the toxicity of oxygen and the mechanisms living organisms utilize to avoid these toxic effects. It is proposed that the primary method used to escape the deleterious effect of O_2 is a multielectron path for the recovery of O_2 which prevents the formation of toxic forms of O_2 . An analysis is presented of the oxygen-dependent phagocyte system in mammals, which has the function of producing reactive forms of O_2 . The possibility of the catalytic production of singlet oxygen ($^1\text{O}_2$) by one of the components of this system, myeloperoxidase, is examined.

N.B.

A83-36810

SYZERS: THE MODELING OF FUNDAMENTAL CHARACTERISTICS OF MOLECULAR-BIOLOGICAL ORGANIZATION - THE CORRESPONDENCE BETWEEN GENERAL PROPERTIES OF GENETIC PROCESSES AND THE STRUCTURAL PECULIARITIES OF MACROMOLECULAR ASSEMBLIES [SAIZERY: MODELIROVANIIE FUNDAMENTAL'NYKH OSOBENNOSTEI MOLEKULIARNO-BIOLOGICHESKOI ORGANIZATSII - SOOTVETSTVIE OBNCHIKH SVOISTV GENETICHESKIKH PROTSESSOV I KONSTRUKTIVNYKH OSOBENNOSTEI KOLLEKTIVOV MAKROMOLEKUL]

V. A. RATNER and V. V. SHAMIN (Akademiia Nauk SSSR, Institut Tsitologii i Genetiki, Novosibirsk, USSR) *Zhurnal Obshchei Biologii* (ISSN 0044-4596), vol. 44, Jan.-Feb. 1983, p. 51-61. In Russian. refs

The most important property of real molecular-genetic control systems is their capability for self-reproduction by means of universal molecular mechanisms. A class of macromolecules, called syzers, which have this property is examined. The macromolecules undergo synthesis on templates, decay, interactions, and changes in a continuous flow reservoir in which a constant density of macromolecules is maintained by draining off the excess macromolecules. The construction of an assembly is determined by the specific relations of mutual recognition, enzyme catalysis, and template coordinations, as well as the structural bonds between macromolecules. The most important constructive limitation connected with the universal processes of template replication is n is less than or equal to $k + 1$, where n is the number of the types of noncoupled templates and k is the number of the various processes in which these templates participate. Therefore, the structural coupling of templates is a powerful means for the stabilization of syzers. The process of the evolution of syzers can be taken as the successive replacement of assemblies containing one or two templates, but having no restrictions on the number of genes or proteins in them and the complexity of construction. It is proposed that syzers play the role of the central object of the theory of molecular-genetic control systems.

N.B.

A83-36812

ELECTRON-MICROSCOPE CYTOCHEMICAL STUDY OF RIBONUCLEOPROTEID PARTICLES IN CEREBRAL CORTEX NEURONS IN A POSTHYPOXIC PERIOD [ELEKTRONNO-TSITOKHIMICHESKOE IZUCHENIE RIBONUKLEOPROTEIDNYKH CHASTITS V NEIRONAKH KORY BOL'SHOGO MOZGA V POSTGIPOKSICHESKOM PERIODE]

V. V. SEMCHENKO and S. S. STEPANOV (Omskii Meditsinskii Institut, Omsk, USSR) *Arkhiv Anatomii, Gistologii i Embriologii* (ISSN 0004-1947), vol. 84, Jan. 1983, p. 14-21. In Russian. refs

A83-36814

THE SECRETORY ACTIVITY OF ACINAR CELLS OF THE PANCREAS AT VARIOUS TIMES OF THE DAY AND THE SEQUENCE OF THE MATURATION PROCESS OF SECRETORY GRANULES [SEKRETORNAIA AKTIVNOST' ATSINOZNYKH KLETOK PODZHELUDOCHNOI ZHELEZY V RAZNOE VREMIA SUTOK I POSLEDOVATEL'NOST' PROTSESSOV SOZREVANIIA SEKRETORNYKH GRANUL]

E. M. EROPKINA (I Leningradskii Meditsinskii Institut, Leningrad, USSR) *Arkhiv Anatomii, Gistologii i Embriologii* (ISSN 0004-1947), vol. 84, Jan. 1983, p. 67-73. In Russian. refs

A83-36827

AN ELECTRODE FOR THE ELECTRONYSTAGMOGRAPHY OF EXPERIMENTAL ANIMALS [ELEKTROD DLIIA ELEKTRONISTAGMOGRAFIU U EKSPERIMENTAL'NYKH ZHIVOTNYKH]

V. I. NAZARENKO and G. A. CHEREDNICHENKO (Kievskii Nauchno-Issledovatel'skii Institut Otolaringologii, Kiev, Ukrainian SSR) *Zhurnal Ushnykh, Nosovykh i Gorlovykh Boleznii* (ISSN 0044-4650), Jan.-Feb. 1983, p. 77, 78. In Russian.

A83-36829

THE PHOSPHOLIPID COMPOSITION OF VARIOUS TISSUES OF RATS IN DEHYDRATION CONDITIONS [FOSFOLIPIDNYI SOSTAV RAZLICHNYKH TKANEI KRYIS PRI OBEZVOZHIVANII ORGANIZMA]

S. N. PETRINA and L. V. IUSHINA (Alma-Atinskii Institut Usovshenstvovaniia Vrachei, Alma-Ata, Kazakh SSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 29, Jan.-Feb. 1983, p 26-29. In Russian. refs

A83-36830

THE EFFECT OF THE ANTIOXIDANT OP-6 ON SEVERAL MODEL REACTIONS OF THE BLOOD COAGULATION SYSTEM [VLIANIE ANTIKSIDANTA OP-6 NA NEKOTORYE MODEL'NYE REAKTSII SISTEMY SVERTYVANIIA KROVI]

A. N. KLEIMENOV, M. A. ROZENFELD, E. B. BURLAKOVA, I. V. ZENKOV, A. A. SHVEDOVA, and L. D. SMIRNOV (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Moscow, USSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 29, Jan.-Feb. 1983, p. 33-37. In Russian. refs

A83-36833

THE HYPERTROPHY OF CELLS AND HYPERPLASIA OF ULTRASTRUCTURES IN SPLEEN PARENCHYMA OF MICE AS A CONSEQUENCE OF ACUTE STRESS [GIPERTROFIIA KLETOK I GIPERPLAZIIA UL'TRASTRUKTUR V PARENKHIME PECHENI MYSHEI KAK SLEDSTVIE OSTROGO STRESSA]

V. A. SHKURUPII and G. G. KOVRIGINA (Novosibirskii Meditsinskii Institut, Novosibirsk, USSR) *Tsitologiya i Genetika* (ISSN 0041-4883), vol. 17, Jan.-Feb. 1983, p. 6-12. In Russian. refs

A83-36834

THE FUNCTIONAL ACTIVITY AND METABOLISM OF NEUTROPHILS OF THE BLOOD UNDER THE EFFECT OF LOW-INTENSITY MICROWAVES [FUNKTSIONAL'NAIA AKTIVNOST' I METABOLIZM NEITROFILOV KROVI PRI VOZDEISTVII MIKROVOLN MALOI INTENSIVNOSTI]

N. M. GONCHAR, M. I. RUDNEV, G. I. VINOGRADOV, and A. A. ZHELEZNIK (Kievskii Nauchno-Issledovatel'skii Institut Obshchei i Kommunal'noi Gigieny, Kiev, Ukrainian SSR) *Tsitologiya i Genetika* (ISSN 0041-4883), vol. 17, Jan.-Feb. 1983, p. 13-16. In Russian. refs

The effect of microwaves of various intensities on the morphology, metabolism, and functional activity of blood cells was investigated. Rats exposed to microwaves at power densities of 10, 50, and 500 microW/sq cm for 7 hr per day for 30 days showed changes in the phagocytic capability of blood neutrophils, glycogen content, and the activity of alkaline phosphatase. The character of the reaction of peripheral blood neutrophils varied according to the intensity of the microwaves. A power density of 500 microW/sq cm lead to an inhibition of the absorption and transforming functions of the neutrophils as well as to a decrease in the activity of alkaline phosphatase and glycogen content. A power density of 10 and 50 microW/sq cm stimulated the defensive reactions of the rats which were expressed by an increase in the quantity of active phagocytes and an increase in their transforming capability. NB

A83-36839

THE ROLE OF CELLULAR MEMBRANES IN THE RESISTANCE OF PLANTS TO HYPOXIA AND ANOXIA [ROL' KLETOCHNYKH MEMBRAN V USTOICHIVOSTI RASTENII K GIPO- I ANOKSII]

T. V. CHIRKOVA (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) *Uspekhi Sovremennoi Biologii* (ISSN 0042-1324), vol. 95, Jan.-Feb. 1983, p. 44-56. In Russian. refs

In the resistance of plants to the action of each environmental factor, nonspecific as well as specific cellular reactions to these influences play an important role and to a great extent are linked with changes in the membrane apparatus. A connection between the degree of resistance of plants to various influences and the condition of their membrane components is found. It is shown that the cellular membranes of plants resistant to deficiencies of oxygen are more stable than those of plants less resistant to

oxygen deficiencies. The great stability of the cellular membrane is one of the primary manifestations of nonspecific resistance. N.B.

A83-36840

THE ROLE OF PROTEOLYSIS IN THE PROCESSING AND INACTIVATION OF NEUROPEPTIDES - ITS POSSIBLE CONNECTION WITH CERTAIN FUNCTIONS OF THE BRAIN [ROL' PROTEOLIZA V PROTSESSINGE I INAKTIVATSII NEUROPEPTIDOV EGO VOZMOZHNAIA SVIAZ' S NEKOTORYMI FUNKTSIIAMI MOZGA]

M. I. EROPKIN (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) *Uspekhi Sovremennoi Biologii* (ISSN 0042-1324), vol. 95, Jan.-Feb. 1983, p. 65-83. In Russian. refs

Proteolysis regulates all stages of the metabolism of neuropeptides beginning with their formation as a result of the synthesis of high molecular weight precursors and subsequent processing to form active molecules up to their final degradation. The pathways of the biosynthesis and degradation of several neuropeptides are examined. Possible mechanisms of the coupling of the limited proteolysis of neuropeptides with the functional lability of the brain and the processes of the transmission and storage of information are discussed. N.B.

A83-36841

THE ACTION OF COLYONES ON ERYTHROPOIESIS (A QUANTITATIVE EVALUATION) [DEISTVIE KEILONOV NA ERITROPOEZ/KOLICHESTVENNAIA OTSENKA/]

G. V. NEUSTROEV (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR) *Uspekhi Sovremennoi Biologii* (ISSN 0042-1324), vol. 95, Jan.-Feb. 1983, p. 84-99. In Russian. refs

It is shown that colyones serve as physiological regulators of erythropoiesis. They are contained in the blood at a concentration of 10 to the -7th M in normal conditions, while during polycythemia the number of colyones increases. During acute blood loss the number of colyones declines and is correlated with the regime of erythron proliferation in these conditions. The primary source of colyones is not the circulating erythrocytes, but erythrocytes which are deposited in the spleen. The production of colyones is controlled by mediators of the sympathico-adrenal system. It is proposed that erythropoietin has a more powerful effect on erythropoiesis than do colyones. N.B.

A83-36985* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

PEPTIDE AND NON-PEPTIDE OPIOID-INDUCED HYPERTHERMIA IN RABBITS

S. B. KANDASAMY and B. A. WILLIAMS (NASA, Ames Research Center, Biosystems Div., Moffett Field, CA) *Brain Research* (ISSN 0006-8993), vol. 265, 1983, p. 63-71. refs

The intracerebroventricular administration of prototype nonpeptide opioid receptor (μ , κ , and σ) agonists, morphine, ketocyclazocine, and N-allyl-normetazocine was found to induce hyperthermia in rabbits. The similar administration of peptide opioids like beta-endorphin (BE), methionine-enkephalin (ME), and its synthetic analogue D-al²-methionine-enkephalinamide (DAME) was also found to cause hyperthermia. Results indicate that only the liver-like transport system is important to the ventricular inactivation of BE and DAME. Prostaglandins and norepinephrine were determined not to be involved in peptide and nonpeptide opioid-induced hyperthermia. In addition, cAMP was not required since a phosphodiesterase inhibitor, theophylline, did not accentuate the hyperthermia due to peptide and nonpeptide opioids. Naloxone-sensitive receptors were found to be involved in the induction of hyperthermia by morphine, BE, ME, and DAME since naloxone attenuated them. However, the hyperthermic response to ketocyclazocine and N-allyl-normetazocine was not antagonized by naloxone. N.B.

N83-26400# California Univ., Irvine, Dayton, Ohio.
PROCEEDINGS OF THE TWELFTH CONFERENCE ON ENVIRONMENTAL TOXICOLOGY

Apr. 1982 411 p refs Conf. held in Dayton, Ohio, 3-5 Nov 1981

(Contract F33615-80-C-0512)

(AD-A115900, AFAMRL-TR-81-149) Avail NTIS HC A16/MF A01 CSCL 06C

Papers were presented in the area of animal modeling of carcinogenesis, sex-related factors influencing toxicity, use of experimental toxicologic data in estimating occupational hazards, use of physiologic kinetics in toxicology, and effects of toxic substances on aquatic organisms

N83-26401# Vermont Univ., Burlington. Dept. of Pathology.
MECHANISMS OF ASBESTOS-INDUCED CARCINOGENESIS IN HAMSTER TRACHEA

B T. MOSSMAN /In Calif. Univ. Proc. of the 12th Conf. on Environ. Toxicol. p 13-23 Apr 1982 refs

(PAPER-1) Avail: NTIS HC A16/MF A01 CSCL 06C

In a recent survey, asbestos was ranked first on the list of carcinogens most hazardous to American industry. A linear dose-response relationship between the cumulative dosage of asbestos and the development of bronchogenic carcinoma was reported in miners, millers, and factory workers. A number of investigators have attempted to induce neoplasms in rodents after intratracheal instillation of asbestos or prolonged periods of exposure in inhalation chambers. The results of these experiments are difficult to interpret because of the small numbers of tumors and incomplete documentation of the types of malignancies observed. However, data show a striking increase in bronchogenic tumors when polycyclic aromatic hydrocarbons (PAH) (i.e., chemical carcinogens found in cigarette smoke) are administered at the same time as asbestos. These observations not only support the results of epidemiologic studies but also establish the critical role of PAH in tumor induction. Author

N83-26402# National Inst. of Environmental Health Sciences, Research Triangle Park, N. C. Lab. of Pulmonary Function and Toxicology.

CHEMICAL CARCINOGENESIS IN CULTURED RAT TRACHEAL EPITHELIUM

V. E. STEELE and S. B. PAI /In Calif. Univ. Proc. of the 12th Conf. on Environ. Toxicol. p 24-34 Apr. 1982 refs

(PAPER-2) Avail: NTIS HC A16/MF A01 CSCL 06C

Respiratory tract epithelium is a critical site for cellular interaction with environmental contaminants. To understand the mechanisms of tumor induction in the target tissue, several experimental models were developed. The recent advances in the ability to culture respiratory tract epithelium have permitted the genesis of invitro studies which promise to elucidate many cellular and biochemical processes in carcinogenesis which were inaccessible in studies with whole animals. Author

N83-26403# Microbiological Associates, Inc., Bethesda, Md. Div. of Toxicology and Oncology.

A MOUSE LUNG CARCINOMA MODEL SYSTEM

R E. KOURI, L. H. BILLUPS, W. C. HALL, and C. J. HENRY /In Calif. Univ. Proc. of the 12th Conf. on Environ. Toxicol. p 35-49 Apr. 1982 refs Sponsored in part by the Council for Tobacco Research

(PAPER-3) Avail: NTIS HC A16/MF A01 CSCL 06C

The mouse presents several unique characteristics which make it a useful model to study the mechanism(s) for the induction of lung cancer. The advantages of using the mouse for such studies are (1) availability of a large number of genetically diverse inbred strains; (2) economy of operation; (3) availability of colonies which are well defined in terms of their biological adventitious agents; and (4) availability of strains of mice in which susceptibility to lung cancer is genetically regulated. To further enhance the utility of the mouse system for carcinogenesis studies, more information is required on the type, location, biologic behavior and the degree of spontaneous occurrence of lung carcinomas. To this end,

experiments were initiated in two strains of mice to determine the occurrence of spontaneous and chemically-induced lung tumors.

Author

N83-26404# Medical Coll. of Ohio, Toledo. Dept. of Pathology.
STRAIN A MOUSE LUNG ADENOMA BIOASSAY FOR CHEMICAL CARCINOGENS

G. D. STONER, E. A. MCCLOSKEY, and P. B. CONRAN /In Calif. Univ. Proc. of the 12th Conf. on Environ. Toxicol. p 50-67 Apr. 1982 refs

(PAPER-4) Avail: NTIS HC A16/MF A01 CSCL 06C

Strain A mice develop a high incidence of primary lung tumors during their lifetime. At 18 to 24 months of age, nearly 100% of strain A mice will have at least one primary tumor per lung and, occasionally, more than one tumor per lung. These tumors are commonly referred to as adenomas. The major determinant for the appearance of lung adenomas in strain A mice is the age of the animal. Older animals have a higher frequency of spontaneous lung tumors than young animals. The development of lung adenomas is not related to the sex of the animal although the males of strain A usually have a slightly higher incidence of both spontaneous adenomas and chemically-induced adenomas than females. There is no relation between the susceptibility of strain A mice to lung tumors and their susceptibility to spontaneous or induced neoplasms in other organs. Author

N83-26405# Medical Coll. of Ohio, Toledo. Dept. of Pathology.
METABOLISM OF BENZO(A)PYRENE IN CULTURED HUMAN BRONCHUS

G. D. STONER and F. B. DANIEL /In Calif. Univ. Proc. of the 12th Conf. on Environ. Toxicol. p 68-82 Apr. 1982 refs

(Contract EPA-807670)

(PAPER-5) Avail: NTIS HC A16/MF A01 CSCL 06C

Lung cancer is a major cause of cancer deaths in many countries. Based on clinical, experimental, epidemiologic and autopsy data, cigarette smoking has been identified as the major risk factor in the development of lung cancer. The majority of lung cancers in man are bronchogenic carcinomas which are thought to arise from a metaplastic squamous differentiation of the large bronchi. Polycyclic aromatic hydrocarbons, such as benzo(a)pyrene (PB), found in cigarette smoke and environmental pollutants, were associated with lung cancer in man. Since most chemical carcinogens have to be metabolically activated in the body before exerting their carcinogenicity, it is important to study the metabolic fate of benzo(a)pyrene in the human bronchus. Recent developments in the maintenance and growth of viable human epithelial tissues and cells in vitro have made possible the study of chemical carcinogenesis directly in human tissue. Author

N83-26406# Chemical Industry Inst. of Toxicology, Research Triangle Park, N.C.

WHOLE ANIMAL SYSTEMS FOR MEASURING CHEMICALLY INDUCED GENOTOXICITY

B. E. BUTTERWORTH and J. C. MIRSALIS /In Calif. Univ. Proc. of the 12th Conf. on Environ. Toxicol. p 140-146 Apr. 1982 refs

(PAPER-8) Avail: NTIS HC A16/MF A01 CSCL 06C

One step in the initiation of carcinogenesis involves damage to the DNA. Mutations in germ cell DNA are responsible for true genetic changes. Numerous techniques are now available to assess the genotoxic activity of a chemical in a variety of bacterial or mammalian cell culture assays such as chemically-induced mutagenesis, DNA damage and repair, cell transformation, and sister chromatid exchange. These assays were termed short-term tests for potential carcinogenicity because of a demonstrated correlation between carcinogenicity and activity in these assays for many classes of chemicals. Such systems are, however, severely limited in their predictive abilities because they do not reflect important species, strain, sex and organ specificities commonly observed in chemical carcinogenesis, and correlations retain a high degree of subjectivity. Author

51 LIFE SCIENCES (GENERAL)

N83-26418# Environmental Protection Agency, Gulf Breeze, Fla Environmental Research Lab.

MICROBIAL DEGRADATION OF XENOBIOTIC COMPOUNDS

A. W. BOURQUIN, J. C. SPAIN, and P. H. PRITCHARD *In Calif. Univ. Proc. of the 12th Conf on Environ. Toxicol* p 354-369 Apr. 1982 refs

(PAPER-21, GB-CONTRIB-437) Avail: NTIS HC A16/MF A01 CSCL 06C

Degradation of toxicants under conditions that maintain complexities of the natural environment and associated microorganisms was studied. Studies with (NTA) nitrotriacetic acid demonstrated that this compound, normally biodegradable in freshwater, persists in estuarine environments. The studies illustrate the complex interactions in natural environments that complicate our understanding of biodegradation mechanisms. Interaction with environmental conditions or lack of genetic capabilities within an environment was demonstrated further when freshwater, but not saltwater, microbial populations were shown to adapt within several days to degrade p-nitrophenol rapidly. Author

N83-26420# Illinois Univ., Urbana. Dept of Botany
DEVELOPMENT AND FUNCTION OF MEMBRANE SYSTEMS IN PLANT TISSUE Annual Technical Progress Report, 15 Sep. 1981 - 15 Aug. 1982

J. B. HANSON 15 Aug 1982 23 p refs

(Contract DE-AC02-76EV-00790)

(DE82-021134; DOE/EV-00790/T1) Avail: NTIS HC A02/MF A01

Ion transport mechanisms in corn roots and mitochondria are discussed. In mitochondria it was found that only citrate and isocitrate are transported by the H⁺ citrate symporter. However, the *in vivo* function of this carrier remains in doubt because citrate does not appear to be an effective for corn mitochondria. Studies with roots were directed to why various types of injury or shock all result in temporary blockage of the H⁺ efflux pump in the plasmamembrane. It appears this may be due to an injury-mediated Ca²⁺ influx into the tissue, which by raising free Ca²⁺ in the cytosol activates calmodulin (CaM). In turn, the Ca²⁺CaM complex appears to activate protein kinase, phosphorylating membrane proteins. It is possible that one of these phosphorylated proteins is responsible for inactivation of the H-ATPase. DOE

N83-26421# Minnesota Univ., Minneapolis. Limnological Research Center.

EXPERIMENTS AND EXPERIENCES IN BIOMANIPULATION. STUDIES OF BIOLOGICAL WAYS TO REDUCE ALGAL ABUNDANCE AND ELIMINATE BLUE-GREENS

J. SHAPIRO, B. FORSBERG (Inst Macional de Amazonia), V. LAMARRA (Utah State Univ, Logan), G. LINDMARK (Lund Univ.), M. LYNCH (Illinois Univ., Urbana), E. SMELTZER (Dept. of Water Resources and Environmental Engineering, Montpelier, Vt.), and G. ZOTO (New England Aquarium, Boston) Dec 1982 259 p refs

(Contract EPA-R-803870)

(PB83-148098; EPA-600/3-82/096) Avail: NTIS HC A12/MF A01 CSCL 08H

Studies have been done to find alternatives to restoring or managing lakes by controlling external sources of nutrients. The guiding principle has been to understand and use biological interactions with lakes. This process is called biomanipulation and it is clear from the results that algal abundance and type can be varied substantially by one or more of the following procedures. Elimination of benthivorous fish which recycle phosphorus from sediments; manipulations of algal populations by lowering pH, causing artificial circulation, and increasing abundance of larger herbivorous zooplankters by reducing predation on them. Author (GRA)

N83-26422# Joint Publications Research Service, Arlington, Va.
USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 17, NO. 2, MARCH - APRIL 1983

O. G. GAZENKO, ed 13 May 1983 149 p refs Transl. into ENGLISH from *Kosmich. Biol. i Aviakosmich. Med* (Moscow), v. 17, no 2, Mar - Apr 1983 96 p

(JPRS-83467) Avail: NTIS HC A07

Space radiation and its hazards to the body are discussed

N83-26433# Joint Publications Research Service, Arlington, Va.
RESULTS OF QUANTITATIVE CYTOLOGICAL ANALYSIS OF RAT THYMUS AFTER FLIGHTS IN BIOSATELLITES

F. V. SUSHKOV, S. V. RUDNEVA, G. N. DURNOVA, and T. F. PONOMAREVA *In its USSR Rept: Space Biol. and Aerospace Med.*, Vol 17, No 2, Mar - Apr. 1983 (JPRS-83467) p 78-84 13 May 1983 refs Transl into ENGLISH from *Kosmich. Biol. i Aviakosmich. Med.* (Moscow), v. 17, no 2, Mar. - Apr. 1983 p 56-61

Avail: NTIS HC A07

The mitotic activity, destruction and volume of thymocytes were investigated on histological preparations of the thymus of rats flown onboard Cosmos-782 and Cosmos-936. The cytological data showed that immediately after touchdown large quantities of thymocytes of the cortical matter perished. The mitotic activity of the remaining undamaged thymocytes declined and returned to normal 9 hours after recovery. The rats that were centrifuged in flight (at 1 g) did not display a lower mitotic activity or noticeable destruction of thymocytes. Karyometric measurements demonstrated that the population of thymic lymphocytes was heterogeneous in the nuclear volume; it consisted of three peak classes of nuclear volumes. The variance curves of nuclear volumes of lymphocytes of the medullary matter were drastically shifted toward large numbers. An increase in the nuclei of thymocytes of the cortical matter in the flight rats was stable and persisted till R+25. Author

N83-26434# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF MORPHOLOGICAL AND FUNCTIONAL PROPERTIES OF RAT PERIPHERAL BLOOD AND BONE MARROW CELLS AFTER FLIGHT IN COSMOS-936 BIOSATELLITE

G. I. KOZINETS, V. I. KOROLKOV, I. I. BRITVAN, I. A. BYKOVA, N. Y. SPITSYNA, N. N. TALELENOVA, V. A. KONDRATYEVA, and N. A. CHELNAYA *In its USSR Rept: Space Biol. and Aerospace Med.*, Vol 17, No. 2, Mar - Apr. 1983 (JPRS-83467) p 85-94 13 May 1983 refs Transl into ENGLISH from *Kosmich. Biol. i Aviakosmich. Med.* (Moscow), v 17, no 2, Mar. - Apr 1983 p 61-65

Avail: NTIS HC A07

Morphofunctional properties of peripheral blood cells of Cosmos-936 rats were examined, using morphological, interferometric and electron microscopic techniques. As follows from the morphological data, immediately after recovery the weightless rats showed symptoms of a stress reaction which disappeared by R+3. The centrifuged rats exhibited less expressed symptoms of this sort. The percentage of bone marrow cell distribution was shifted towards enhanced myelopoiesis and diminished erythropoiesis. By the end of the readaptation period the ratio of bone marrow cell composition returned to normal. Interferometric and electron microscopic examinations did not reveal any irreversible changes in the structure and function of cells that may be caused by zero-g. Author

N83-26435# Joint Publications Research Service, Arlington, Va.
ACTIVITY OF SOME ENZYMES IN RAT LIVER SUBCELLULAR FRACTIONS AFTER FLIGHT ABOARD COSMOS-1129 BIOSATELLITE

R. A. TIGRANYAN, Y. G. VETROVA, S. ABRAHAM, C. LIN, H. KLEIN, and C. WOLKMAN. *In its* USSR Rept. Space Biol. and Aerospace Med., Vol. 17, No. 2, Mar. - Apr. 1983 (JPRS-83467) p 91-94. 13 May 1983. refs. Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 2, Mar. - Apr. 1983 p 65-67.
 Avail: NTIS HC A07

The activities of malate, isocitrate and lactate dehydrogenases were measured in the liver mitochondrial and cytoplasmic fractions of rats flown for 18.5 days onboard Cosmos-1129. The activities of the oxidative enzymes, malate and isocitrate dehydrogenases, in the mitochondrial fraction and those of the glycolytic enzyme, lactate dehydrogenase, in the cytoplasmic fraction were found to decrease. Author

N83-26436# Joint Publications Research Service, Arlington, Va.
EFFECT OF HYPOKINESIA ON VITAMIN D METABOLISM IN RATS

I. N. SERGEYEV, Y. P. ARKHAPCHEV, V. B. SPIRICHEV, A. S. USHAKOV, M. S. BELAKOVSKIY, L. F. LINBERG, N. V. BLAZHEYEVICH, S. V. SOKOLOVA, and V. A. YURKIV. *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 2, Mar. - Apr. 1983 (JPRS-83467) p 95-103. 13 May 1983. refs. Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 2, Mar. - Apr. 1983 p 68-73.
 Avail: NTIS HC A07

The effect of short- (7 days) and long-term (28 days) hypokinesia on 25-oxcholecalciferol metabolism was investigated in rats that were fed diets containing adequate amounts of vitamin D, calcium and phosphorus. Eighteen hours before sacrifice the animals were injected 3H-25(OH)D₃. 3H-metabolites of D₃ formed in vivo were separated by high-performance liquid chromatography, and their concentrations in the serum, kidneys, intestinal mucosa and bones were measured. Long-term hypokinesia decreased the content of 3H-1,25(OH)₂D₃ and increased that of 3H-24,25(OH)₂D₃ in the serum and kidneys. The exposure diminished the content of both 3H-1,25(OH)₂D₃ and 3H-24,25(OH)₂D₃ in the intestinal mucosa and bones and increased that of nonmetabolized 3H-25(OH)D₃. The data obtained are indicative of a lower synthesis of 1,25(OH)₂D₃ and a higher synthesis of 24,25(OH)₂D₃ in the kidneys, as well as of a reduced binding of 24,25(OH)₂D₃ in the intestinal mucosa and bones in hypokinetic rats. Possible causes of variations in the biosynthesis of vitamin D active metabolites and their contribution to the disorders of calcium metabolism and bone density during hypokinesia are discussed. Author

N83-26437# Joint Publications Research Service, Arlington, Va.
HEMODYNAMICS OF PULMONARY CIRCULATION DURING PROLONGED HYPOKINESIA (ACCORDING TO RESULTS OF MORPHOLOGICAL INVESTIGATION)

V. I. YAKOVLEVA. *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 2, Mar. - Apr. 1983 (JPRS-83467) p 104-108. 13 May 1983. refs. Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 2, Mar. - Apr. 1983 p 73-76.
 Avail: NTIS HC A07

Data on pulmonary circulation of rats during prolonged hypokinesia (30 to 165 days) are presented. It was found that the hypokinetic exposure of 30 to 60 days produced venous and, in particular, capillary plethora associated with blood redistribution and pooling in the lungs. As the exposure continued, the plethora

level decreased due to the development of compensatory-adaptive reactions in the lung vessels. For instance, on hypokinetic day 90 small arteries of the muscle type developed a spasm which accelerated circulation stabilization. By hypokinetic days 120-165 pulmonary circulation returned to normal due to the further development of compensatory adaptive mechanisms in lung vessels (tendency for hypertrophy of the media of small arteries and increase of its cross-sectional area). Author

N83-26442# Joint Publications Research Service, Arlington, Va.
STUDY OF PSYCHOPHYSIOLOGICAL DISTINCTIONS OF PRIMATES USING DELAYED REACTION TEST

I. P. SHEREMET, G. S. BELKANIYA, and N. F. SOFIAKIS. *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 2, Mar. - Apr. 1983 (JPRS-83467) p 133-137. 13 May 1983. refs. Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 2, Mar. - Apr. 1983 p 90-92.
 Avail: NTIS HC A07

The efficacy of teaching and training is largely determined by the characteristics of animals' higher nervous activity (HNA). Such elements of HNA as short-term and long-term memory, which correlate the most with the learning capacity of animals, are particularly important. In view of the need to screen monkeys for teaching them operator work following the program of preparations for an experiment aboard an artificial earth satellite, our aim was to search for and refine an objective psychophysiological test. The method of testing delayed reactions (DR), which is used extensively to assess intercentral relations in the central nervous system, effect of diverse factors on human and animal memory and experimental study of interaction between different forms of memory served as our basis. DR are a complex neuropsychological phenomenon and for this reason most studies deal with the reflex basis and neurophysiology of DR. Our purpose here was to adapt the method of testing DR to the test requirements, as well as to use the developed DR test to evaluate individual psychophysiological reactivity of monkeys. L.F.M.

N83-26443# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES: BIOMEDICAL AND BEHAVIORAL SCIENCES, NO. 34

20 May 1983. 130 p. refs. Transl. into ENGLISH from various Russian articles.
 (JPRS-83514) Avail: NTIS HC A07

Activities in the fields of biotechnology, epidemiology, genetic engineering, laser effects, marine biology, medical demography, microbiology and pharmacology are discussed. Adaptation to polar environments and the electrical activity of the sympathetic nervous system are also discussed. The dynamics of microbial-cell dehydration in the air was studied.

N83-26444# Joint Publications Research Service, Arlington, Va.
DYNAMICS OF DEHYDRATION OF MICROBIAL CELLS IN AN AERODISPersed STATE UNDER VARYING ATMOSPHERIC HUMIDITY

V. F. KONYUKHOV and L. A. MALTSEVA. *In its* USSR Rept.: Life Sci., Biomed. and Behavioral Sci., No. 34 (JPRS-83514) p 1-7. 20 May 1983. refs. Transl. into ENGLISH from Zh. Mikrobiol. Epidemiol. i Immunobiol. (Moscow), no. 9, Sep. 1981 p 62-66.
 Avail: NTIS HC A07

The dynamics of microbial-cell dehydration in the air was studied. The influence of this process upon microbial-cell viability was also studied by using the nuclear magnetic resonance (NMR) method. B.W.

51 LIFE SCIENCES (GENERAL)

N83-27569* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

RAPID, QUANTITATIVE DETERMINATION OF BACTERIA IN WATER Patent

E. W. CHAPPELLE, G. L. PICCIOLO (Hahnemann Hospital, Philadelphia, Pa.), R. R. THOMAS (Boeing Co., Houston, Tex.), E. L. JEFFERS (Boeing Co., Houston, Tex.), and J. W. DEMING, inventors (to NASA) (Hahnemann Hospital, Philadelphia, Pa.) 20 Mar. 1978 18 p Filed 20 Mar. 1978 Supersedes N78-22585 (16 - 13, p 1734)

(NASA-CASE-GSC-12158-1; US-PATENT-4,385,113, US-PATENT-APPL-SN-888434; US-PATENT-CLASS-435-8, US-PATENT-CLASS-422-52; US-PATENT-CLASS-435-3; US-PATENT-CLASS-435-34; US-PATENT-CLASS-435-38; US-PATENT-CLASS-435-39; US-PATENT-CLASS-435-289; US-PATENT-CLASS-435-291) Avail: US Patent and Trademark Office CSCL 06C

A bioluminescent assay for ATP in water borne bacteria is made by adding nitric acid to a water sample with concentrated bacteria to rupture the bacterial cells. The sample is diluted with sterile, deionized water, then mixed with a luciferase-luciferin mixture and the resulting light output of the bioluminescent reaction is measured and correlated with bacteria present. A standard and a blank also are presented so that the light output can be correlated to bacteria in the sample and system noise can be subtracted from the readings. A chemiluminescent assay for iron porphyrins in water borne bacteria is made by adding luminol reagent to a water sample with concentrated bacteria and measuring the resulting light output of the chemiluminescent reaction.

Official Gazette of the U.S. Patent and Trademark Office

N83-27570# Air Force Inst of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A FINITE ELEMENT ANALYSIS OF THE CREEP RESPONSE OF LUMBAR INTERVERTEBRAL JOINTS IN THE RHESUS MONKEY M.S. Thesis

W. J. ROTHWELL, JR. Dec. 1982 185 p refs (AD-A124740; AFIT/GAE/AA/82D-24) Avail: NTIS HC A09/MF A01 CSCL 06S

Lumbar intervertebral centra from healthy, adolescent Rhesus Monkeys (Macaca Mulatta) were subjected to axial compression loads of 15 and 30 pounds for a period of eight hours and displacement-time data was gathered. An axisymmetric finite element model was used to analytically determine material parameters describing the observed creep for each applied load. Analytical stress profiles in two horizontal planes through the vertebral centrum indicated a predominance of stress in cortical bone and the transition of stress from the Trabecular bone to the Cortical bone as creep proceeded. According to the model, the Centrum behaved as though the Cortex was acting like a thin shell constraining the outward flow of a viscoelastic Trabecular bone region. Viscoelastic constants determined for the Trabecular bone region were incorporated into an overall model of the intervertebral joint minus the Articular Facet Joint and associated spinous processes.

GRA

N83-27571# California Univ., Berkeley. Lawrence Berkeley Lab.

BIOMEDICAL APPLICATIONS OF DIGITAL AUTORADIOGRAPHY WITH A MWPC

R. BELLAZZINI, G. BETTI, A. DELGUERRA, M. M. MASSAI, M. RAGADINI, G. SPANDRE, G. TONELLI, R. VENTURI, and F. ZITO May 1982 11 p Presented at the World Congr on Med Phys. and Biomed. Eng., Hamburg, 6 Sep 1982 (Contract W-7405-ENG-48, DE-AC03-76SF-00098) (DE82-017055; LBL-13772; CONF-820921-2) Avail: NTIS HC A02/MF A01

A Multiwire Proportional Chamber (MWPC) was used as a beta (-) radioactivity detector in biological and medical applications. Two different kinds of experiments were performed: the study of variations in the ability of cell clones to incorporate a radioactive precursor of DNA biosynthesis and the regional carbohydrate

consumption in myocardial tissue by means of a deposit tracer of glucose metabolism.

DOE

N83-27572# Joint Publications Research Service, Arlington, Va USSR REPORT: LIFE SCIENCES. EFFECTS OF NONIONIZING ELECTROMAGNETIC RADIATION, NO. 9

3 Jun. 1983 44 p refs Transl. into ENGLISH from various Russian articles

(JPRS-83601) Avail: NTIS HC A03

Effects of nonionizing electromagnetic radiation on organisms and biological tissues are reported. Topics discussed are: effects of decimeter waves, microwave effects; mathematical modeling methods; alternating magnetic fields and magnetic field effects, electrostatic field effects, magnetic field therapy; decimeter wave treatment; biological effects of ultraviolet radiation; high frequency and ultrahigh frequency electric fields

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AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

A83-33541#

EFFECT OF LENGTH OF SERVICE ON GROUND CREW HEARING THRESHOLD

O. FUJIWARA (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Tokyo, Japan) Japan Air Self Defence Force, Aeromedical Laboratory, Reports (ISSN 0023-2858), vol. 23, Dec. 1982, p. 149-170 In Japanese, with abstract in English refs

The records of accumulated hearing loss among ground crew members exposed to jet aircraft noise were examined to determine the relation between the length of service and the magnitude of hearing loss. A total of 1111 crew members were examined in terms of four five year increments in service, i.e., 1-5, 6-10, 11-15, and 16-20 yr. Hearing loss was found to equal between right and left ears, and it was determined that 20-30 pct of the ground crew did not utilize the ear plugs or muffs that were supplied to them. Hearing losses of 30 dB were experienced by 14 pct of the sample. A numerical formulation was developed to predict the extent of hearing loss expected among a member of a ground crew.

M S.K.

A83-33777

MODIFYING OCULOMOTOR ACTIVITY IN AWAKE SUBJECTS INCREASES THE AMPLITUDE OF EYE MOVEMENTS DURING REM SLEEP

J. H. HERMAN and H. P. ROFFWARG (Texas, University, Health Science Center, Dallas, TX) Science (ISSN 0036-8075), vol. 220, June 3, 1983, p. 1074-1076. refs

(Contract NIH-MH-3414)

A83-34423

THE ROLE OF THE OSMOLARITY OF THE BLOOD SERUM IN THE PATHOGENESIS OF MENIERE'S DISEASE [ROL' OSMOLIARNOSTI SYVOROTKI KROVI V PATOGENEZE HOLEZNI MEN'ERA]

V. T. PALCHUN, O. A. BUIANOVSKAIA, V. I. ASLAMAZOVA, and T. S. POLIAKOVA (II Moskovskii Meditsinskii Institut, Moscow, USSR) Vestnik Otorinolaringologii (ISSN 0042-4668), May-June 1983, p. 3-7. In Russian. refs

A83-34872**EXPOSURE DURATION AFFECTS THE SENSITIVITY OF VERNIER ACUITY TO TARGET MOTION**

M. J. MORGAN, R. J. WATT (University College, London, England), and S. P. MCKEE (Smith-Kettlewell Institute for Visual Science, San Francisco, CA) Vision Research (ISSN 0042-6989), vol. 23, no. 5, 1983, p. 541-546. Sponsorship Medical Research Council of England refs

(Contract UKMRC-G979/870/N; NIH-EY-03976)

Threshold vernier acuity was measured under different conditions of target movement and exposure duration. In the case of a simple two-line vernier target, image motion up to about 3 deg/sec had little effect upon threshold for a briefly exposed (130 msec) target, which is relatively poor even for a stationary stimulus, but produced a decrement in acuity for a continuously exposed stimulus. This finding was repeated in a second experiment, which used a centroid cue to vernier offset, and which compared the effects of horizontal and vertical target orientation. It is suggested that image motion and reduced exposure duration restrict the proportion of the light spread function that can be usefully sampled by the neural networks responsible for hyperacuity. Author

A83-34873* California Univ., Berkeley.**PUPILLARY ESCAPE INTENSIFIED BY LARGE PUPILLARY SIZE**

L. STARK (California, University, Berkeley, CA) and F. SUN Vision Research (ISSN 0042-6989), vol. 23, no. 6, 1983, p. 611-615 refs

(Contract NCC2-86)

Pupil responses to light are greatly influenced by initial pupil size. Small pupils, operating under photopic conditions, show tonic responses to step increases of light and high gains; thus the pupil is a good regulator of light. Large pupils, operating under mesopic or scotopic conditions show phasic responses, 'pupillary escape', and smaller gains. The pupil only transiently influences retinal flux. By using accommodation level to set the size of the pupil, the mechanism of the 'pupil size effect' is shown to be dependent on retinal light level only so far as retinal activity sets pupil size. Author

A83-34874**SPATIAL SENSITIZATION AND DESENSITIZATION WITH SMALL ADAPTING FIELDS - INTERACTIONS OF SIGNALS FROM DIFFERENT CLASSES OF CONES**

C. F. STROMEYER, III (Harvard University, Cambridge, MA) Vision Research (ISSN 0042-6989), vol. 23, no. 6, 1983, p. 621-630. refs

(Contract NIH-EY-01808)

Thresholds for brief, tiny flashes were measured on small adapting fields at 5 deg retinal eccentricity. Rod influence was eliminated by bleaching. Green and red small adapting fields raised the threshold for a green test flash by stimulating both middle and long wave cones - thus spatial desensitization by small adapting fields is not cone-specific. However, a small adapting field that strongly stimulated only short wave cones did not affect the visibility of a long wave flash. Spatial sensitization was also measured, using green or red annuli that surrounded a small red field and green test probe. Sensitization was not cone-specific. Possible mechanisms producing desensitization with small fields and annular sensitization are discussed. Author

A83-34927**THE DIAGNOSTICS, TREATMENT, AND PROPHYLACTIC MEASURES FOR THE INITIAL APPEARANCES OF BRAIN BLOOD INSUFFICIENCIES [DIAGNOSTIKA I LECHEBNO-PROFILAKTICHESKIE MEROPRIIATIIA PRI NACHAL'NYKH PROIAVLENIIAKH NEDOSTATOCHNOSTI KROVOSNABZHENIIA MOZGA]**

E. I. GUSEV, G. S. BURD, L. A. NIFONTOVA, A. V. CHUGUNOV, O. B. CHUMAK, E. I. IAFAEVA, V. M. KUZIN, B. V. PEROV, and D. D. PANKOV (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) Zhurnal Nevropatologii i Psikiatrii im. S. S. Korsakova (ISSN 0044-4588), vol. 83, no. 1, 1983, p. 3-10. In Russian.

A83-34928**THE RADIOISOTOPE (XE-133) INHALATION METHOD FOR DETERMINING THE REGIONAL BRAIN BLOOD FLOW [RADIOIZOTOPNYI /XE-133/INGALIATSIONNYI METOD OPREDELENIIA REGIONARNOGO MOZGOVOGO KROVOTOKA]**

N. V. VERESHCHAGIN, I. V. MUSATOVA, and M. A. PIRADOV (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR) Zhurnal Nevropatologii i Psikiatrii im. S. S. Korsakova (ISSN 0044-4588), vol. 83, no. 1, 1983, p. 16-21. In Russian. refs

A83-34929**THE DEPENDENCE OF THE ORIGIN OF ACUTE DISORDERS OF THE BRAIN BLOOD CIRCULATION ON THE CHANGES OF METEOROLOGICAL FACTORS [ZAVISIMOST' VOZNIKNOVENIIA OSTRYKH NARUSHENII MOZGOVOGO KROVOOBRASHCHENIIA OT IZMENENII METEOROLOGICHESKIKH FAKTOROV]**

V. K. DIACHENKO (Kurskii Meditsinskii Institut, Kursk, USSR) Zhurnal Nevropatologii i Psikiatrii im. S. S. Korsakova (ISSN 0044-4588), vol. 83, no. 1, 1983, p. 48-53. In Russian. refs

The effect on the frequency of acute disorders of the brain blood circulation of individual meteorological factors is analyzed, including the effects of wind speed, barometric pressure, the 24-hr changes in barometric pressure, relative air humidity, air temperature, the 24-hr changes in the air temperature, the oxygen content of the air, and the 24-hr changes in the oxygen content of the air. The average daily number of patients was analyzed, and 4023 cases of acute disorders of the brain blood circulation were studied. Results show that wind, relative air humidity, and the 24-hr changes in the oxygen content of the air significantly influenced the frequency of acute disorders of the brain blood circulation. When the wind speed increased by 1 m/sec the rate of these disorders increased by 6.9 percent, when the relative humidity increased by 1 percent the frequency of these disorders decreased by 1 percent, and when the oxygen content in the air changed by 1 g/cu m the frequency of these disorders increased by 3 percent. N.B.

A83-34932**A HYGIENIC EVALUATION OF THE COMBINED EFFECT OF INFRASOUND AND LOW-FREQUENCY NOISE ON THE AUDITORY AND VESTIBULAR ANALYZER OF COMPRESSOR OPERATORS [GIGIENICHESKAIA OTSENKA KOMBINIROVANNOGO VOZDEISTVIIA INFRAZVUKA I NIZKOCHESTOTNOGO SHUMA NA SLUKHOVOI I VESTIBILIARNYI ANALIZATOR KOMPRESSORSHCHIKOV]**

P. N. DOROSHENKO and I. D. STEPCHUK (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Sakharnoi Promyshlennosti, Kiev, Ukrainian SSR) Gigiena Truda i Professional'nye Zabolevaniia, Jan. 1983, p. 35-38. In Russian. refs

A83-34934

SOME METHODOLOGICAL APPROACHES TO THE EVALUATION OF THE MORBIDITY WITH TEMPORARY LOSS OF WORK CAPACITY OF WOMEN WORKING IN THE METRO [NEKOTORYE METODICHESKIE PODKHODY K OTSENKE ZABOLEVAEMOSTI S VREMENNOI UTRATOI TRUDOSPOSOBNOSTI RABOTAIUSHCHIKH NA METROPOLITENE ZHENSCHIN]

A. A. PROKHOROV and N. T. KONKINA (Institut Zheleznodorozhnoi Gigieny, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia, Jan. 1983, p. 13-16. In Russian. refs

A83-34935

NEW NORMS FOR NOISE ON SEA VESSELS [NOVYE NORMY SHUMA NA MORSKIKH SUDAKH]

I. I. VARENIKOV, S. S. MARKARIAN, O. K. KUBIAK, IU. A. KOROTKOV, and N. A. STRUNILIN (Institut Gigieny Vodnogo Transporta, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniia, Dec. 1982, p. 40-42. In Russian. refs

Results are presented for a 5-year study of the acoustical conditions of work and relaxation for 1750 sailors on 46 ships. Also examined are the results of questionnaires concerning the perceived levels of noise and vibration on ships as compared with instrumental determinations of these levels. The findings were used in conjunction with the results of research concerning the dose-effect relationship of noise and vibration in order to develop 'Sanitary norms for noise on sea vessels' (No. 2498-81), which regulates the permissible levels of noise for different areas of the ships. N.B.

A83-34938

A COMPARATIVE EVALUATION OF THE SIMPLIFIED TONOGRAPH METHODS OF NESTEROV AND KAL'FA-VURGAFT [SRVNIENIE NAIA OTSENKA UPROSHCHENNYKH METODOV TONOGRAFI PO NESTEROVU I KAL'FA-VURGAFTU]

P. G. KRASNIKOV (Donetskii Meditsinskii Institut, Donetsk, Ukrainian SSR) Oftal'mologicheskii Zhurnal (ISSN 0030-0675), vol. 37, no. 8, 1982, p. 493, 494. In Russian.

A comparison of the simplified tonograph methods of Nesterov and Kal'fa-Vurgaft is presented based on data obtained from 49 eyes of patients with primary glaucoma. It is found that the differences in the mean values of the outflow facility coefficient of the aqueous humor and Becker's coefficient obtained using these methods are insignificant. The mean values of the true intraocular pressure and the minute volume of the aqueous humor obtained by using the Nesterov method are higher than those obtained by using the Kal'fa-Vurgaft method. N.B.

A83-34939

THE OBJECTIVE MEASUREMENT OF ANATOMICAL AND OPTICAL PARAMETERS OF EMMETROPIC AND AMETROPIC EYES [OB'EKTIVNOE IZMERENIE ANATOMO-OPTICHESKIKH PARAMETROV EMMETROPICHESKIKH I AMETROPICHESKIKH GLAZ]

A. I. DASHEVSKII (Dnepropetrovskii Meditsinskii Institut, Dnepropetrovsk, Ukrainian SSR) Oftal'mologicheskii Zhurnal (ISSN 0030-0675), vol. 37, no. 8, 1982, p. 484-487. In Russian. refs

A83-34941

SEVERAL INDICATORS OF THE FUNCTIONAL CONDITION OF THE HUMAN BODY DURING A PROLONGED LOW-CALORIE DIET CONSISTING OF CANNED FOODS [NEKOTORYE POKAZATELI FUNKSIONAL'NOGO SOSTOIANIIA ORGANIZMA CHELOVEKA PRI PRODOLZHITEL'NOM PITANII MALOKALORIINYM RATSIONOM IZ KONSERVIROVANNYKH PRODUKTOV]

E. P. TSYGANOV, E. V. KOLCHIN, and A. N. AGUREEV Voprosy Pitaniia (ISSN 0042-8833), Nov-Dec 1982, p. 30-33. In Russian. refs

A83-34943

THE DETERMINATION OF THE PROPER VALUES OF EXTERNAL RESPIRATION [K VOPROSU OPREDELENIIA DOLZHNYKH VELICHIN VNESHNEGO DYKHANIIA]

V. G. EREMEEV (Zaporozhskii Meditsinskii Institut, Zaporozhe, Ukrainian SSR) Vrachebnoe Delo (ISSN 0049-6804), Dec 1982, p. 12-14. In Russian. refs

The possible discrepancies in the parameters of the proper respiratory capacity (PRC) as determined by calculations involving a nomogram (Magazanik and Shul'gin, 1965) and a formula (All-Union symposium on the clinical physiology of respiration, 1973) were examined. The proper values of the respiratory capacities of 233 subjects (125 males and 108 females) were compared, and the patterns in the differences of the PRC according to the nomogram and the formula were determined. It was found that the discrepancies in the values of the PRC as determined by the nomogram and the formula may be disregarded due to their small size and the high positive correlation dependence. N.B.

A83-34944

THE RESULTS OF THE BICYCLE ERGONOMETER TEST IN PATIENTS WITH ISCHEMIC HEART DISEASE DURING DIFFERENT BODY POSITIONS [REZULTATY VELOERGOMETRICHESKOI PROBY U BOL'NYKH ISHEMICHESKOI BOLEZN'IU SERDTSA PRI RAZLICHNOM POLOZHENII TELA]

L. A. SHESTIDESIATNAIA (Kievskii Nauchno-Issledovatel'skii Institut Kardiologii, Kiev, Ukrainian SSR) Vrachebnoe Delo (ISSN 0049-6804), Dec. 1982, p. 36-38. In Russian. refs

The hemodynamics and oxygen supply were studied in 38 patients with chronic ischemic heart disease (stages II-III) during the performance of bicycle ergometer tests in the sitting and lying positions. The size of the threshold load and the amount of completed work were significantly lower in the lying position for all groups, but this difference increased as the tolerance to physical loads declined. The sizes of the beat and cardiac indices were found to be significantly higher in patients fulfilling a threshold load in the lying position. The amounts of the oxygen consumption and the oxygen pulse were found to be significantly higher at the threshold load in the lying position in comparison with the sitting position. It is concluded that bicycle ergometer tests in the sitting and lying positions can be used as an additional diagnostic test to determine the patterns of the cardiac reserve and the functional possibilities of the cardiorespiratory system in patients with ischemic heart disease. N.B.

A83-34946

THE INFORMATION CONTENT OF TESTS EMPLOYED FOR CHARACTERIZING THE PHYSICAL PREPARATION OF HUMANS [INFORMATIVNOST' TESTOV, ISPOL'ZUEMYKH DLIA KHAARAKTERISTIKI FIZICHESKOI PODGOTOVLENNOSTI CHELOVEKA]

E. IA BONDAREVSKII, IU. G. DANILOV, S. P. EPIFANOV, IU. I. GONCHAROV, V. M. GONCHAROVA, and IU. E. KOCHARIAN (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, USSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Jan 1983, p. 23-25. In Russian. refs

A wide variety of physical exercises are evaluated for their information content about the physical preparation of athletes. These tests include throwing a ball for distance, throwing a ball for accuracy, step test, standing broad jump, 1500 m run, and breath holding. The information content of each of these physical tests is determined and is placed on a common scale to allow for comparison. It is determined that no one test can be used to adequately evaluate all aspects of physical preparation. It is found that the information content of the motor tests is lower than that of tests having the highest factor loads in all the analyzed exercises or an orthogonally separated factor. N.B.

A83-34948

THE TIME OF THE DEVELOPMENT OF AN INTERFERENCE ELECTROMYOGRAM AS AN INDICATOR OF THE SPEED AND STRENGTH OF AN ATHLETE [VREMIA RAZVITIIA INTERFERENTSIONNOI ELEKTROMIOGRAMMY KAK POKAZATEL' SKOROSTNO-SILOVYKH PROIAVLENII SPORTSMENA]

V. L. FEDOROV (Moskovskii Oblastnoi Gosudarstvennyi Institut Fizicheskoi Kul'tury, Moscow, USSR) and A. ERRERA (Gavanskii Institut Fizicheskoi Kul'tury, Havana, Cuba) *Teoriia i Praktika Fizicheskoi Kul'tury* (ISSN 0040-3601), Dec 1982, p 18-20 In Russian

A83-34949

A STUDY OF THE STRENGTH AND ENDURANCE OF INDIVIDUAL GROUPS OF MUSCLES USING A POLYERGOCORPOGRAPHIC DEVICE [ISSLEDOVANIE SILY I VYNOSLIVOSTI OTDEL'NYKH GRUPP MYSHTS S POMOSHCH'IU POLIERGOKORPOGRAFICHESKOI USTANOVKI]

F. G. BURIKIN and M. A. KESEDZHIAN (Armianskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Armenian SSR) *Teoriia i Praktika Fizicheskoi Kul'tury* (ISSN 0040-3601), Dec. 1982, p. 20-22 In Russian refs

A83-34950

THE DETERMINATION OF CIRCULATING IMMUNE COMPLEXES BY A SPECTROPHOTOMETRIC METHOD [OPREDELENIE TSIRKULIRUIUSHCH IMMUNNYKH KOMPLEKSOV METODOM SPEKTROFOTOMETRII]

P. V. BARANOVSKII and B. I. RUDYK (Ternopol'skii Meditsinskii Institut, Ternopol, Ukrainian SSR) *Laboratornoe Delo* (ISSN 0023-6749), no 12, 1982, p 739-741. In Russian. refs

A method using polyethylene glycol is developed for estimating the concentration of circulating nonspecific immune complexes in blood serum by determining the amount of light scattering in the control and sample. It is proposed that the protein concentration in g/l be used as units instead of the usual extinction units. A calibration curve for the degree of light scattering according to the amount of gamma-globulin is developed using UV spectrophotometry at 220 nm, while the concentration of immune complexes is determined at 450 nm in a cuvette with a 1 cm light path. This method was applied to determining the amount of immune complexes in the blood serum of 15 patients with severe bronchial asthma and 24 patients with myocardial infarcts. It was found that the patients with bronchial asthma exhibited significant increases in the content of immune complexes, while only slight changes were observed in the patients with myocardial infarcts.

N.B

A83-34951

ELECTROENCEPHALOGRAM INDICATORS AND HYPOXIC SHIFTS IN PATIENTS WITH HYPERTENSION WITH DIFFERENT HEMODYNAMIC VARIATIONS [POKAZATELI ELEKTROENTSEFALOGRAMMY I GIPOKSICHESKIE SDVIGI U BOL'NYKH GIPERTONICHESKOI BOLEZN'IU S RAZLICHNYMI GEMODINAMICHESKIMI VARIANTAMI]

N. S. ZANOZDRA and I. A. KARMAZINA (Ukrainskii Nauchno-Issledovatel'skii Institut Kardiologii, Kiev, Ukrainian SSR) *Kardiologiya* (ISSN 0022-9040), vol 23, Jan. 1983, p 104, 105. In Russian refs

A83-34952

PREDICTING THE IMMEDIATE OUTCOMES OF MYOCARDIAL INFARCTS /PROGRESS, DIFFICULTIES, AND FUTURE DEVELOPMENTS/ [PROGNOZIROVANIE BLIZHAISHIKH ISKHODOV PRI INFARKTE MIOKARDA /DOSTIZHENIIA, TRUDNOSTI I PERSPEKTIVY/]

E. E. GOGIN and V. M. SABLIN (Glavnyi Voennyi Klinicheskii Gosptal', Moscow, USSR) *Kardiologiya* (ISSN 0022-9040), vol 23, Jan. 1983, p 5-9 In Russian. refs

A83-34953

PREDICTING COMPLEX VENTRICULAR ARRHYTHMIAS DURING VARIOUS PERIODS OF MYOCARDIAL INFARCTION [PROGNOZIROVANIE SLOZHNYKH ZHELUDOKHOVYKH ARITMII V RAZLICHNYE PERIODY INFARKTA MIOKARDA]

V. G. POPOV, G. A. BARYSHNIKOVA, V. V. SOLOVEV, N. K. ROZOVA, L. D. MESHALKIN, and V. I. ZARUTSKII (Ministerstvo Zdravookhraneniia SSSR, Moscow, USSR) *Kardiologiya* (ISSN 0022-9040), vol 23, Jan. 1983, p. 10-16 In Russian. refs

A83-34954

PREDICTING THE COURSE AND OUTCOME OF ACUTE MYOCARDIAL INFARCTION [PROGNOZIROVANIE TECHENIIA I ISKHODA OSTROGO INFARKTA MIOKARDA]

R. S. BABARSKENE, L. L. VILKAUSKAS, and I. I. DIMSHA (Kaunasskii Meditsinskii Institut, Kaunas, Lithuanian SSR) *Kardiologiya* (ISSN 0022-9040), vol 23, Jan. 1983, p 16-18 In Russian. refs

A83-34955

PREDICTING THE POSSIBILITY OF MYOCARDIAL INFARCTION [PROGNOZIROVANIE VOZMOZHNOСТИ VOZNIKNOVENIIA INFARKTA MIOKARDA]

E. SH. KHALFEN (Ministerstvo Zdravookhraneniia RSFSR, Leningradskii Nauchno-Issledovatel'skii Institut Kardiologii, Saratov, USSR) *Kardiologiya* (ISSN 0022-9040), vol 23, Jan 1983, p 19-25. In Russian refs

A program based on 19 risk factors is developed for predicting the possibility of developing myocardial infarcts during the course of a 5-yr period. Each risk factor is given a weight and the combined risk factors are utilized to calculate the risk of infarction for an individual. A 3-yr study using this program for 4019 individuals shows that no infarcts were observed in individuals with a low prognostic index, while the medium index was associated with infarction in 0.36 percent of the subjects and the high risk index was associated with infarction in 26 percent of the subjects. It is suggested that since the high risk group constituted only 4 percent of the individuals studied, it seems possible to provide an effective prevention of myocardial infarction for this high risk group. N.B.

A83-34956

THE ULTRASTRUCTURAL BASES OF PULMONARY EDEMA IN PATIENTS WITH MYOCARDIAL INFARCTION [UL'TRASTRUKTURNYE OSNOVY OTEKA LEGKIKH U BOL'NYKH INFARKTOM MIOKARDA]

L. I. KATELNITSKAIA, E. A. BARDAKHCHIAN, and B. I. VOROBEV (Rostovskii Meditsinskii Institut, Rostov-on-Don, USSR) *Kardiologiya* (ISSN 0022-9040), vol 23, Jan. 1983, p. 50-54. In Russian. refs

A83-34957

NEW DATA ABOUT THE MECHANISMS OF THE ADAPTATION TO PHYSICAL LOADS DURING ISCHEMIC HEART DISEASE AND WAYS OF USING THESE DATA DURING THE REHABILITATION OF PATIENTS WITH MYOCARDIAL INFARCTION [NOVYE DANNYE O MEKHANIZMAKH ADAPTATSII K FIZICHESKIM NAGRUZKAM PRI ISHEMICHESKOI BOLEZNI SERDTSA I PUTI IKH ISPOL'ZOVANIIA PRI REABILITATSII BOL'NYKH INFARKTOM MIOKARDA]

D. M. ARONOV and L. V. ZHUKOVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Kardiologiya* (ISSN 0022-9040), vol 23, Jan. 1983, p. 75-79 In Russian refs

A83-34959

RENIN, KALLIKREIN, AND THE ANGIOTENSIN-CONVERTING ENZYME DURING A PHYSICAL LOAD IN HUMANS [RENIN, KALLIKREIN I ANGIOTENZIN-PREVRASHCHAIUSHCHII FERMENT PRI FIZICHESKOI NAGRUZKE U CHELOVEKA]

E. P. SVISHCHENKO, O. A. GOMAZKOV, L. S. CHORNOGUZ, and A. A. IAKOVLEV (Ukrainskii Nauchno-Issledovatel'skii Institut Kardiologii; Ministerstvo Zdravookhraneniia Ukrainsskoi SSR, Institut Endokrinologii i Obmena Veshchestv, Kiev, Ukrainian SSR, Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Biulleten' Eksperimental'noi Biologii i Meditsiny* (ISSN 0006-4041), vol. 94, Dec. 1982, p. 7-9. In Russian refs

The relationship of the activity of renin, the angiotensin-converting enzyme, the activity of prekallikrein, and the level of kallikrein in the blood was studied in healthy males who performed physical exercise on a bicycle ergometer. Also measured were several hemodynamic parameters, including the systolic and diastolic arterial pressures, the heart rate, stroke volume, cardiac index, and the specific peripheral resistance. An analysis of blood samples collected before and after the physical exercise indicated a 41.4 percent rise in the activity of renin and a 95 percent increase in the activity of kallikrein, while the level of prekallikrein and the activity of the angiotensin-converting enzyme decreased by 19 and 13 percent, respectively. These changes were accompanied by significant shifts in the hemodynamic parameters, including a 107 percent rise in the heart rate, a 36.7 percent rise in the systolic arterial pressure, and a 41.4 percent reduction in the specific peripheral resistance. N.B.

A83-34969

A TABLE FOR PREDICTING THE DEVELOPMENT OF CEREBRAL STROKES [TABLITSA DLIYA PROGNOZIROVANIIA VOZNIKNOVENIIA MOZGOVYKH INSUL'TOV]

N. S. MISIUK and N. M. ANOSOVA (Akademiia Meditsinskikh Nauk SSSR, Minsk, Belorussian SSR) *Zhurnal Nevropatologii i Psikiatrii im. S. S. Korsakova* (ISSN 0044-4588), vol. 82, no. 12, 1982, p. 1805-1808. In Russian. refs

A83-34970

THE REGULATORY MECHANISMS OF PERCEPTION - THE QUESTION OF THE REGULATION OF SENSITIVITY [REGULIATORNYE MEKHANIZMY VOSPRIYATIYA - K VOPROSU O REGULIATSII CHUVSTVITEL'NOSTI]

I. A. KORSAKOV (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Obshchei i Sudebnoi Psikiatrii, Moscow, USSR) *Zhurnal Nevropatologii i Psikiatrii im. S. S. Korsakova* (ISSN 0044-4588), vol. 82, no. 12, 1982, p. 1843-1848. In Russian refs

The participation of the slow electrical activity of the visual area of the cortex in the regulation of perception was investigated in normal individuals, excitable psychopathic patients, and patients having a simple form of schizophrenia with apatho-abulic manifestations. The experiments involved the perception of light flashes of equivalent and different brightnesses. Results show that the correct perception of the intensity of the light flashes depended on the stabilization of the slow potentials during 100-200 msec following the stimulus in all subjects studied. No such stabilization was observed in the cases of incorrect perception. However, a correlation was found between the psychological condition of the subject and the pattern of the slow potentials in the poststimulus interval. It is concluded that the regulation of sensory perception is directly connected with the participation of changes in the cortex potential and that the mechanism of this regulation has an active character. N.B.

A83-34971

THE EFFECT OF MAGNETOTHERAPY ON THE CARDIOVASCULAR SYSTEM OF PATIENTS WITH HYPERTENSION [VLIYANIE MAGNITOTERAPII NA SERDECHNO-SOSUDISTUIU SISTEMU BOL'NYKH GIPERTONICHESKOI BOLEZNIU]

G. I. EGOROVA, L. A. KOMAROVA, and V. V. BOGDANOV (Leningradskii Institut Usovershenstvovaniia Vrachey, Leningrad, USSR) *Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury* (ISSN 0042-8787), Nov.-Dec. 1982, p. 44-46. In Russian. refs

A83-34972

THE APPLICATION OF EUPHYLLINE ELECTROPHORESIS WITH SINUSOIDAL MODULATED CURRENTS IN THE TREATMENT OF PATIENTS WITH TRANSITORY DISORDERS OF THE BRAIN BLOOD CIRCULATION [PRIMENENIE EUPHILLIN-ELEKTROFOREZA SINUSOIDAL'NYMI MODULIROVANNYMI TOKAMI V LECHENII BOL'NYKH S PREKHODIASHCHIMI NARUSHENIAMI MOZGOVOGO KROVOOBRAZHENIYA]

N. A. ANNAKLYCHEVA and A. K. MAMIEV (Turkmenskii Nauchno-Issledovatel'skii Institut Nevrologii i Fizioterapii, Ashkhabad, Turkmen SSR) *Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury* (ISSN 0042-8787), Nov.-Dec. 1982, p. 49-51. In Russian.

A83-34973

THE USE OF THE SOUND LOADING TEST IN COMPREHENSIVE AUDIOLOGICAL DIAGNOSIS [ISPOL'ZOVANIE TESTA ZVUKOVOI NAGRUZKI V KOMPLEKSE AUDIOLOGICHESKOI DIAGNOSTIKI]

A. S. ROZENBLIUM (Leningradskii Nauchno-Issledovatel'skii Institut po Bolezniam Ukh, Gora, Nosa i Rechi, Leningrad, USSR) *Zhurnal Ushnykh, Nosovykh i Gorlovnykh Bolezney* (ISSN 0044-4650), Nov.-Dec. 1982, p. 38-41. In Russian. refs

The reverse adaptation time was measured in 248 patients with peripheral and central disorders of the auditory analyzer following 2 min of a sound load at 2000 Hz at an intensity of 40 dB above the auditory threshold. Results show that patients with brain stem and diencephalon disorders exhibited a prolonged reverse adaptation time. It was found that the diagnostic value of the reverse adaptation time increased when the results of this test were compared with those of tonal threshold audiometry.

N B

A83-34978

A REVIEW OF THE LITERATURE CONCERNING RESUSCITATION FROM HYPOTHERMIA. II - SELECTED REWARMING PROTOCOLS

R. M. HARNETT, J. R. PRUITT, and F. R. SIAS (Clemson University, Clemson, SC) *Aviation, Space, and Environmental Medicine* (ISSN 0095-0562), vol. 54, June 1983, p. 487-495. Sponsorship: U.S. Coast Guard. refs
(Contract USCG-72074-A)

A83-34981

THE HUMAN ELEMENT IN AIR TRAFFIC CONTROL - AEROMEDICAL ASPECTS, PROBLEMS, AND PRESCRIPTIONS

S. R. MOHLER (Wright State University, Dayton, OH) *Aviation, Space, and Environmental Medicine* (ISSN 0095-0562), vol. 54, June 1983, p. 511-516. refs

A discussion is presented of certain identified factors regarding the characteristics and health of air traffic controllers that bear upon the safety and efficiency of flight activities. Historical surveys of selected physiologic, behavioral, and medical aspects are included. Topics examined include the medical standards for air traffic controllers, the revision of inappropriate medical standards, and the effect of stressful working conditions and its relation to the health of controllers. In addition, the air traffic controller psychophysiology and pathophysiology responses to work are examined in detail based on the results of the Air Traffic Controller Health Change Study (1978). Among other results, this study found

that the population of controllers had an increased prevalence and incidence of hypertension compared to the general population and to pilots, half the controllers in the survey were diagnosed as having at least one psychiatric problem, and over 50 percent of the controllers were classified as heavy drinkers. Several recommendations are presented based on these findings, such as the establishment of training programs in medication, relaxation, and other approaches to lowering the blood pressure in controllers susceptible to hypertension. N.B.

A83-34983

A MODEL FOR PREDICTION OF RESYNCHRONIZATION AFTER TIME-ZONE FLIGHTS

H. M. WEGMANN, K. E. KLEIN, B. CONRAD, and P. ESSER (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmedizin, Cologne, West Germany) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, June 1983, p. 524-527 refs

Utilizing experimental data from three flight studies, a concept was developed which allows appraising average resynchronization for any day after arrival in a new time-zone. The course of adaptation is nonlinear and can be mathematically represented by an exponential function. The model predicts higher initial resynchronization rates when more time zones are crossed, but total time for complete reentrainment is essentially the same and, thus is independent of the number of time-zones. The equation derived from experimental data is converted into an e-function and the resulting time constants are presented as they evolved for different functions and flight directions. Author

A83-34987

THE RELATIONSHIP BETWEEN AEROBIC FITNESS AND CERTAIN CARDIOVASCULAR RISK FACTORS

T. E. BROWN, W. S. MYLES, and C. L. ALLEN (Defence and Civil Institute of Environmental Medicine, Downsview, Ontario, Canada) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, June 1983, p. 543-547. refs

The relationship between aerobic fitness and the incidence of risk factors related to cardiovascular disease was investigated for 2501 Canadian servicemen 18-50 years of age. Aerobic power was obtained from the heart rate measured during submaximal bicycle exercise; while serum cholesterol, serum triglycerides, blood pressure, and body fat (sum of three skinfolds) were utilized as risk factors. The incidence of cigarette smoking was also determined from a questionnaire. The total population tested was divided into three age groups, each of which was composed of four fitness categories. Results show an inverse relationship between fitness category and the mean values for all measured risk factors. This relationship was most evident in the older subjects, although it was also presented in men under 30 years of age. A similar inverse relationship was found for all age groups between fitness category and the percent of subjects considered to have an elevated cholesterol, triglyceride, blood pressure, or skinfold thickness. The incidence of cigarette smoking was found to be inversely related to fitness category only in those 30 years of age and over. These results indicate that participation in a program to improve physical fitness may lead the individual to modify other components of his lifestyle. N.B.

A83-34988

MINIMAL CORONARY ARTERY DISEASE AND CONTINUATION OF FLYING STATUS

G. M. MCGRANAHAN, JR., J. R. HICKMAN, JR., G. S. UHL, M. A. MONTGOMERY, and J. H. TRIEBWASSER (USAF, School of Aerospace Medicine, Brooks AFB, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, June 1983, p. 548-550. refs

Results are presented of a study which followed aviators with minimal coronary artery disease who had been returned to flying duties. This study was instituted by the USAF School of Aerospace Medicine (USAFSAM) in 1976. Aviators were returned to flying status if no single lesion was greater than 30 percent and the aggregate of lesions was not greater than 50 percent. Excluded

from this group were subjects with symptoms of ischemia, ECG and/or arrhythmias, left ventricular dysfunction, or any degree of left main coronary disease. A total of 12 aviators were returned to flying status with minimal disease and the health of these aviators has been monitored. Also examined are the results of a separate natural history study of 15 asymptomatic subjects with 30-50 percent lesions and the natural history of subjects with less than 30 percent from the USAFSAM catheterization file. The results of these studies indicate that aviators with no lesions greater than 30 percent and no aggregate of lesions greater than 50 percent can be safely returned to flying status, provided that repeat cardiac catheterizations are performed at one to three year intervals, depending on the results of annual evaluations which include a thorough risk factor analysis, treadmill testing, complete non-invasive evaluation, and nuclear imaging studies. N.B.

A83-34989

ENVIRONMENTALLY INDUCED CHOLINERGIC URTICARIA AND ANAPHYLAXIS

J. E. WHINNERY and G. K. ANDERSON (USAF, School of Aerospace Medicine, Brooks AFB, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, June 1983, p. 551-553 refs

Four case studies of USAF crewmen referred to the USAF School of Aerospace Medicine for aeromedical evaluation are presented in order to illustrate the spectrum of problems that can be associated with cholinergic urticaria. It is shown that numerous environmental stimuli can initiate cholinergic urticaria, and severe systemic manifestations may be associated with the onset of the urticaria. Exercise-induced anaphylaxis is a specific life-threatening reaction that occurs very unpredictably in susceptible individuals with cholinergic urticaria. Anaphylactic episodes are associated with severe hypotension, syncope, or laryngeal edema. Treatment with appropriate medications has been found to be generally effective in controlling these symptoms, although these medications frequently have side effects not tolerable in high-risk situations. It is concluded that exercise history is an important part of the evaluation of an aviator with suspected urticaria. N.B.

A83-35047

RHEOGRAPHIC INVESTIGATIONS OF THE STROKE VOLUME OF THE HEART IN ANTIORTHOSTATIC HYPOKINESIA [BADANIA REOGRAFICZNE POJEMNOSCI WYRZUTOWEJ SERCA W HIPOKINEZJI ANTYORTOSTATYCZNEJ]

L. GOLEC (Wojskowy Instytut Medycyny Lotniczej, Warsaw, Poland) Postepy Astronautyki (ISSN 0373-5982), vol. 15, no. 4, 1982, p. 7-17. In Polish. refs

The antiorthostatic test was evaluated as a model of weightlessness in studies using nine healthy men 21-29 years of age. The subjects were placed on a tilt table at angles of -4, -12, and -22 degrees, and the stroke volume, minute volume, and heart rate were measured using rheographic methods. The changes in these physiological parameters indicated that the initial period of adaptation to conditions of weightlessness (hemodynamic shifts) can be simulated by antiorthostatic hypokinesia at a tilt angle of -4 degrees. N.B.

A83-35049

THE PROBLEMS OF HEALTH PROTECTION IN POLAR EXPEDITIONS AND THEIR IMPORTANCE FOR SPACE FLIGHTS [PROBLEMY OCHRONY ZDROWIA W ZABEZPIECZENIU EKSPEDYCJI POLARNEJ I ICH ZNACZENIE DLA ASTRONAUTYKI]

T. BOSZKIEWICZ (Wojskowy Instytut Medycyny Lotniczej, Warsaw, Poland) Postepy Astronautyki (ISSN 0373-5982), vol. 15, no. 4, 1982, p. 29-43. In Polish. refs

Antarctica can be considered as an experimental region for obtaining information of interest to aerospace medicine. Polar explorers are subjected to examinations in severe polar climatic conditions in order to determine their psychophysical fitness. These examinations can discover prepathological conditions and can be used to predict the capability of the subject to perform complex tasks. The health protection organization is of great importance in

carrying out these tasks. It is connected with the selection of qualified personnel and equipment, medical training, and sanitary-hygiene and anti-epidemic protection, as well as performing scientific investigations. N B

A83-35561**SCHEDULING WORK AND REST FOR THE HOT AMBIENT CONDITIONS WITH RADIANT HEAT SOURCE**

E. KAMON, J. BENSON, and K. SOTO (Pennsylvania State University, University Park, PA) *Ergonomics* (ISSN 0014-0139), vol 26, Feb. 1983, p. 181-192. refs

The results of laboratory tests of the effectiveness of a work-rest cycle design for heavy labor performed in conditions of high levels of radiant heat (R) are reported. The cycle design was based on previous research that identified a linear correlation between the increments in the heart rate (HR) and R, along with data on the maximal O₂ uptake. The tests involved three 30 min sessions of work and rest in a heated environment, with the middle session being a rest condition in ambient temperature surroundings. A treadmill was employed to simulate varying levels of labor, and the test chamber atmosphere was varied between warm-humid, hot-dry, and hot-humid conditions. Four subjects participated in the trials, with measurements made of the rectal temperature, mean skin temperature, sweat production, aerobic capacity, and the heat exchange from the body. The cycle design was confirmed to be sound in principle, but to require further refinement in terms of the age, physical fitness, and heat acclimatization of older workers who actually labor near blast furnaces or anodizing vats. M S K

A83-35562**CIRCADIAN RHYTHM AMPLITUDE - IS IT RELATED TO RHYTHM ADJUSTMENT AND/OR WORKER MOTIVATION?**

D. S. MINORS and J. M. WATERHOUSE (Manchester, Victoria University, Manchester, England) *Ergonomics* (ISSN 0014-0139), vol 26, March 1983, p. 229-241. Sponsorship: Ministry of Defence and Medical Research Council. refs
(Contract MOD-D/F10/143/4; MRC-G978/1126/N)

The results of two studies are presented, one from subjects undergoing an irregular schedule of sleep and wakefulness in an isolation unit, the other from nurses during their normal night duty. In the first, for individuals during the irregular schedule, some evidence is seen for an inverse relationship between the amplitude and acrophase adjustment of the circadian rhythms of deep body temperature and urinary excretion of potassium, sodium, and urate. No clear relationships between these variables are found, this is the case when group data from the subjects are considered and when the amplitude of circadian rhythms during conventional hours of sleep and wakefulness is compared with acrophase adjustment on the irregular schedule. In the second study, evidence is found that nurses working at night on single occasions only continued a conventional diurnal routine as far as possible, when a number of consecutive nights were worked, however, there is evidence that substantial changes in routine, even encroaching upon leisure time, took place. This, it is noted, can be interpreted as 'commitment' on the part of frequent night workers. The possible relationship between the amplitude of circadian rhythms and 'commitment' in shift workers is discussed. C.R.

A83-35576**RELIEF VISION AND PILOTING [VISION DU RELIEF ET PILOTAGE]**

P. J. MANENT (Centre Principal d'Expertise Medicale du Personnel Navigant de l'Aeronautique, Paris, France) *Medecine Aeronautique et Spatiale*, vol 22, 2nd Quarter, 1983, p. 124-127. In French.

The factors involved in pilot depth perception, particularly over terrain featuring varying degrees of relief, are discussed. Depth perception during take-off is a significant factor only when towing an aircraft or during the take-offs of a large number of patrol aircraft. The faculty is critical in level flight when turbulence is present and the terrain is very uneven. Helicopter pilots in hover or flight at low altitudes depend on depth perception, to judge the distance to the ground when the downwash vortices cause clouds

of obscuring debris. Continual shifting of vision from the cockpit displays to external points is required for safe aircraft landings. In-flight, the visual cues are clarity, brightness, and the color of the objects. Objects farther away are blurred, indistinct, and when nearer offer contrasting planes. The size of the image on the retina and parallax movements also provide depth information. Stereograms and stereometry have been used to study spatial perception, which is affected by the ground configuration, the airspeed (particularly at low altitude), and the ambient light, as well as organic dysfunctions and health. M.S.K.

A83-35577**COLOR VISION AND VISION AT LOW LIGHT LEVELS [LA VISION DES COULEURS ET LA VISION AUX BASSES LUMINANCES]**

J. P. CHEVALERAUD (Lignes Aeriennes Interieures Air Inter, Paray-Vieille-Poste, Essonne; Union de Transports Aeriens, Puteaux, Hauts-de-Seine, France) *Medecine Aeronautique et Spatiale*, vol 22, 2nd Quarter, 1983, p. 128-131. In French.

The mechanisms and capabilities of chromatic vision are explored, with attention given to pilot color vision requirements. Anomalies in color vision are caused either by heredity or are acquired, both origins produce similar results, i.e., errors in color recognition. The introduction of color-coded CRT displays in digital avionics aggravate the possible hazards from operation by a pilot who is partially color-blind. The problem is augmented by the use of colored ground lights in category III terrain. Lower light levels cause a cessation in reactivity of the cone pigments and a heightening of the effect of the rods being excited. Low light levels enlarge the pupil and aggravate prebyopia, diminish the chromatic sensitivity and sensitivity to the central visual field, and cause underestimations of horizontal and vertical (altitude) distances. Blurring is, however, the worst problem, and increases with age, which may impose an age limit on pilots. M.S.K.

A83-35578**PROCEDURES FOR THE EXAMINATION OF THE VISUAL ACUITY AND OF THE VISUAL FIELD IN CIVIL AERONAUTICS [LES PROCEDES D'EXAMENS DE L'ACUITEVISUELLE ET DU CHAMP VISUEL EN AERONAUTIQUE CIVILE]**

J. P. BOISSIN (Compagnie Nationale Air France, Paris, France) *Medecine Aeronautique et Spatiale*, vol 22, 2nd Quarter, 1983, p. 132-134. In French.

A83-35579**VERTEBRAL LESIONS AFTER THE AIRCRAFT CRASHES [LES LESIONS VERTEBRALES APRES CRASH D'AVIONS]**

R. AUFFRET and R. P. DELAHAYE *Medecine Aeronautique et Spatiale*, vol 22, 2nd Quarter, 1983, p. 139, 140. In French.

The mechanisms and the types of spinal injuries incurred by pilots and passengers on subsonic aircraft during a crash are described. The sequences of the injuries were characterized in part through laboratory trials with car crashes. The highest number of vertebral lesions, 65-75 pct, happen in the D10-L2 section of the vertebral column. Direct traumatism have been identified as the primary cause of the generally multiple fractures of the transverse apophyses of the lumbar vertebrae. Passengers insufficiently restrained in their seat are subject to three main categories of injury, the knee-hip syndrome, concussions and whiplash, and traumatic injuries in the thoracic region. The forces in an aircraft crash reach 100-500 g for a 1/100 sec duration, with the extent of injuries being dependent on the distance the passenger travels before impact, the ability of the aircraft and the body to absorb the impact, the attenuation of the crash energy by ground structures, and the rise time of the negative acceleration forces. M.S.K.

A83-35580

VERTEBRAL LESIONS AFTER PILOT EJECTION FROM FIGHTER AIRCRAFT [LESIONS VERTEBRALES APRES EJECTION DES PILOTES D'AVIONS DE COMBAT]R. AUFFRET and R. P. DELAHAYE. *Medecine Aeronautique et Spatiale*, vol. 22, 2nd Quarter, 1983, p. 141-143. In French.

An examination of the vertebral fractures incurred by 130 pilots out of 678 NATO flight personnel who ejected from fighter aircraft revealed the presence of 216 fractures. A total of 37 pct of the fractures were confined to the D12-L1 area. Ejection involves two critical stages, the ejection of the seat and the landing. The acceleration out of the cockpit imparts a 20 g force for 0.2-0.5 sec at a rise rate of 200 g/sec. Insufficient restraint by the seat harness allows dangerous levels of bending in the spine, while belts too tight will encourage dorsal region fractures. The vertebral lesions appear in the regions of maximum spinal bending, usually in the D4-D9 area. Injuries are inhibited if the seat height has been correctly adjusted, if the angle between the thighs and the trunk are kept at 135 deg, and if the spine is not aligned with the line of acceleration during ejection.

M.S.K.

A83-35581

THE SPINE OF THE PARACHUTIST [LA COLONNE VERTEBRALE DU PARACHUTISTE]A. LEGER and R. P. DELAHAYE. *Medecine Aeronautique et Spatiale*, vol. 22, 2nd Quarter, 1983, p. 143-148. In French. refs

Parachute design has moved toward removal of opening shock from the areas of vital organs and to protect the spine. Only 10 pct of all parachute traumatism now occur in the spine. However, the implementation of lighter, higher-performance materials for parachutes has caused them to open quicker, thus increasing the danger of spinal trauma. Thirty to forty spinal lesions are recorded each year in France. The initial opening of the parachute generally involves a deceleration from 50 to 5 m/sec, and the force on the parachutist's spine is proportional to his mass and the length of time before the parachute opens. The injuries generally happen in the D8-D9 spinal region, a fact that can be explained in terms of the head position. Most (90 pct) injuries occur during landing, due to obstacles, incorrect positioning, and the compressive shock. Further study is recommended to quantify the level of opening shock and the duration of acceleration, so that appropriate parachute materials and configurations can be recommended.

M.S.K.

A83-35582

THE SPINE AND THE HELICOPTER [RACHIS ET HELICOPTERE]P. J. METGES, J. L. POIRIER, H. VIEILLEFOND, and R. P. DELAHAYE (Hopital d'Instruction des Armees Begin, Saint-Mande, Val-de-Marne, Centre d'Essais en Vol Bretigny-sur-Orge, Essonne, France). *Medecine Aeronautique et Spatiale*, vol. 22, 2nd Quarter, 1983, p. 148-152. In French. refs

The causes and protective measures for chronic back pain incurred by helicopter pilots after prolonged flight duty are discussed. The pain is generally felt in the lumbar region. Acute onset can lead to detection of a herniated disk, or an origin in the ligaments, articulations, or muscles, while the problem can evolve over an extended period into a chronic ailment. Causative factors have been identified as an asymmetric position in the seat, an ill-fitting seat that is designed neither for the pilot nor the aircraft, and mechanical vibrations, which oscillate different parts of the pilot's body at different frequencies. It is recommended that the seat be designed to equalize weight distribution, to accommodate the various pilot functions, to fit the posture of a pilot, and to cushion the lumbar region. Pilot selection procedures should include a criterion of good pervertebral and abdominal muscle development. Finally, ergonomically designed controls are indicated.

M.S.K.

A83-35583

THE PILOT SEAT AND THE VERTEBRAL COLUMN [LE SIEGE DU PERSONNEL NAVIGANT ET LA COLONNE VERTEBRALE]J. L. POIRIER, P. J. METGES, G. PLANTUREUX, R. AUFFRET, and R. P. DELAHAYE. *Medecine Aeronautique et Spatiale*, vol. 22, 2nd Quarter, 1983, p. 153-157. In French. refs

The results of radiological examinations of pilots of various types of aircraft to improve the pilot seat design are discussed. Particular attention was given to the spinal column, its support in a seat, and potential injuries, as well as the causes of recurring aches reported after sustained flight duty, particularly in helicopters. Radiological surveys were performed of subjects seated in chairs which could be reconfigured to emulate the seats in commercial and military aircraft. The goal was to ensure equal distribution of the loads on the spine, permit equivalent functioning of the body parts, to maintain support levels evenly distributed with any seat inclination, and to employ an adjustable lumbar cushion in all seats. No seat configuration was found that was suitable for all aircraft. A minimum set of seat design requirements was defined, including the outfitting of all seats with the capability of adjustments in the three spatial planes, and that the seat back be adjustable independently from the seat itself. Finally, particular attention is recommended to lumbar and dorsal support.

M.S.K.

A83-35584

PROBLEMS OF FITNESS POSED BY VERTEBRAL PATHOLOGY IN FLIGHT PERSONNEL [PROBLEMES D'APTITUDE POSES PAR LA PATHOLOGIE VERTEBRALE CHEZ LE PERSONNEL NAVIGANT DE L'AERONAUTIQUE]G. LEGUAY, P. J. METGES, A. LEGER, A. SEIGNEURIC, and R. P. DELAHAYE (Service de Santes des Armees, Paris, France). *Medecine Aeronautique et Spatiale*, vol. 22, 2nd Quarter, 1983, p. 157-166. In French.

Various aspects of vertebral pathologies, their detection, classification, and treatment in flight personnel are discussed. Topics addressed include the nature of the assessment (at the initial selection of flight personnel or at the regular examination of trained flight personnel), the type of work involved which places strains on different critical segments of the spine (e.g., combat pilots, helicopter pilots, transport pilots, and parachutists), the pathology and its cause, and therapeutic measures and their compatibility with aviation requirements. Pathologies of the vertebral column involve congenital abnormalities, lesions as a consequence of illness, and problems as a result of the after effects of trauma, inflammatory rheumatism, and degenerative rheumatism. Pathologies examined include dorsolumbar scoliosis, dorsal kyphosis, the aftereffects of epiphysis, transitory lumbosacral abnormalities, and the aftereffects of dorsolumbar and cervical fractures. These different types of vertebral pathologies are examined in detail and are classified according to their effects for the different categories of flight personnel.

N.B.

A83-35585

PRACTICAL ASPECTS OF THE MEDICAL CHECK-UP OF NONPROFESSIONAL PILOTS [ASPECTS PRATIQUES DE LA SURVEILLANCE MEDICALE DES PILOTES PRIVES]J. LAVERNHE (Compagnie Nationale Air France, Paris, France). *Medecine Aeronautique et Spatiale*, vol. 22, 2nd Quarter, 1983, p. 167-171. In French.

The special problems posed for aerospace medicine and safety by nonprofessional pilots are discussed based on recent data for France. The social-psychological context of nonprofessional pilots involves their large numbers, limited flying experience, and their particular motivations for flying. The technical characteristics of flying light airplanes and the related medical and physiological aspects are considered, including the problems of hypoxia, pressure variations, acceleration, and climates normally encountered by pilots of small aircraft. The process of certifying nonprofessional pilots in France is examined focusing on the activities, functions, and responsibilities of the Medical Council of Civil Aeronautics. In addition, the application to nonprofessional pilots of the decree of 25 January 1978 concerning the medical fitness of flight personnel

is discussed, including the problems of the sudden incapacitation or partial incapacitation of pilots during flight. N.B.

A83-35587

BAROTRAUMATISM AND A KILLIAN POLYP IN A PARACHUTIST [BAROTRAUMATISME ET POLYPE DE KILLIAN CHEZ UN PARACHUTISTE]

J. F. GOUTEYRON, J. FLAGEAT, P. J. METGES (Hopital d'Instruction des Armees Begin, Saint-Mande, Val-de-Marne, France), H. LIENHARDT, and P. BUFFE (Centre Principal d'Expertise Medicale du Personnel Navigant, Paris, France) *Medecine Aeronautique et Spatiale*, vol. 22, 2nd Quarter, 1983, p. 183, 184. In French

A clinical study is presented of an amateur parachutist who developed a rare case of a Killian polyp. This type of polyp acts to block the ostium of the maxillary sinus and the eustachian tube, but it is asymptomatic and is not observed during normal clinical examinations. This small polyp results in barotraumatic manifestations which become noticeable during certain maneuvers undertaken by parachutists. A simple surgical treatment for removing this and similar types of polyps is presented which allowed the parachutist to resume his activity. N.B.

A83-35596

PHYSIOLOGICAL AND HYGIENIC ASPECTS OF ARTIFICIAL HEAT ADAPTATION (REVIEW OF THE LITERATURE) [FIZIOLOGO-GIGIENICHESKIE ASPEKTY ISKUSSTVENNOI TEPLOVOI ADAPTATSII /OBZOR LITERATURY/]

I. U. A. IVANOV and V. M. ORLOVSKI. *Voenna-Meditsinskii Zhurnal* (ISSN 0026-9050), April 1983, p. 46-48. In Russian refs

A review is presented of research concerning methods used in to increase the adaptability of humans to hot climates, focusing on methods of long-term adaptation. Nonspecific artificial adaptation to heat can be achieved by intensive physical training in mild conditions (temperature 20-21 C, relative humidity 35-65 percent) and by training in hypoxic conditions. Specific artificial adaptation can be achieved by physical training in a specially-designed heated room. Attention is given to the use of artificial heat adaptation for military applications in various climatic zones. The training regime, amount of relative humidity, the clothing for the trainees, the need for various minerals and nutrients (including potassium, magnesium, salt, and vitamin C), and the criteria to determine successful adaptation are examined. N.B.

A83-35901

PHYSIOLOGICAL SHIFTS IN THE SLEEP-WAKEFULNESS CYCLE UNDER THE INFLUENCE OF A PHYSICAL LOAD [FIZIOLOGICHESKIE SDVIGI V TSIKLE BODRSTVOVANIE-SON POD VLIANIEM FIZICHESKOI NAGRUZKI]

A. M. VEIN, N. A. VLASOV, and T. S. ELIGULASHVILI (I Moskovskii Meditsinskii Institut, Moscow, USSR) *Fiziologiya Cheloveka* (ISSN 0131-1646), vol. 9, May-June 1983, p. 355-359. In Russian refs

A combined physiological and psychological investigation was conducted in order to determine the effects of standard physical loads on the sleep-wakefulness cycle in healthy human subjects. The physical load consisted of exercise on a bicycle ergometer for 85 min at 45 percent of maximal work capacity 2 and 1/2 hours before sleep. Parameters measured included the heart rate, EKG, EEG, skin-galvanic response, the delta-index, and the activation index of motion. Results show that the duration of delta sleep, primarily during the 1st cycle, increases during sleep in healthy individuals following the application of a standard dynamic physical load. Activation shifts, found in the awake periods following the application of a physical load and subsequent sleep, are mediated reactions to corresponding changes in the sleep at night. These changes, which are characteristic for each functional condition in the sleep-wakefulness cycle, indicate the presence of a circadian physiological optimum with corresponding self-regulatory mechanisms. N.B.

A83-35902

BRAINSTEM AUDITORY EVOKED POTENTIALS [SLUKHOVYE VYZVANNYE POTENTIALY STVOLA MOZGA]

G. A. TAVARTKILADZE (Ministerstvo Zdravookhraneniia RSFSR, Moskovskii Nauchno-Issledovatel'skii Institut Ukh, Gorla i Nosa, Moscow, USSR) *Fiziologiya Cheloveka* (ISSN 0131-1646), vol. 9, May-June 1983, p. 360-368. In Russian. refs

The dependence of the brainstem auditory evoked potentials (BAEP) in normal individuals on the intensity of the stimulation using ipsilateral and contralateral leads of the potentials is investigated, and the binaural interaction of the BAEP is determined. It is found that the latent period of components I, III, and V of the BAEP; the intervals between peaks I-III, I-V, and N1-V, and the ratio of the amplitude of components V/I are the most stable indicators for comparative analysis between individuals. The use of the simultaneous registration of BAEP with ipsilateral and contralateral leads allows the identification of peaks and the graphical separation of components PIV and PV, which is necessary for determining the area of the injury at the brainstem level. The binaural interaction of the BAEP in humans is shown in the interval between peaks PV-NV (latent period 6.32 msec) and can be used as a diagnostic test for brainstem injuries, as well as for studying the functional development of the auditory system. N.B.

A83-35903

THE SELECTIVE SENSITIVITY OF COLOR MECHANISMS OF VISION TO SPATIAL FREQUENCY [SELEKTIVNAIA CHUVSTVITEL'NOST' TSVETOVYKH MEKHANIZMOV ZRENIIA K PROSTRANSTVENNOI CHASTOTE]

A. V. BERTULIS and S. A. IAKUBENENE (Kaunasskii Meditsinskii Institut, Kaunas, Lithuanian SSR) *Fiziologiya Cheloveka* (ISSN 0131-1646), vol. 9, May-June 1983, p. 369-373. In Russian. refs

The selectivity of individual color mechanisms to spatial frequencies in humans was studied in a series of psychological and physiological investigations using the method of Blakemore and Campbell (1969) for determining the adaptation to gratings. Using this method of adaptation, the dependence of the threshold of the discrimination of the color of gratings on the spatial frequency of the adapting gratings was measured. Results show that at the lowest spatial frequencies, adaptation to a white grating increases the threshold of the discrimination of the color of the tested grating. The maximum increase in the threshold was observed when the frequencies of the test and adapting gratings coincided. The interval of frequencies which showed the effect of adaptation is found to depend on the color of the tested grating. N.B.

A83-35904

AN EVALUATION OF THE CONDITION AND POTENTIAL OF ATHLETES USING INDICATORS OF HUMORAL-HORMONAL REACTIONS [OTSENKA SOSTOIANIIA I VOZMOZHNOSTEI SPORTSMENA PO POKAZATELIAM GUMORAL'NO-GORMONAL'NYKH REAKTSII]

G. N. KASSIL (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Moscow, USSR) *Fiziologiya Cheloveka* (ISSN 0131-1646), vol. 9, May-June 1983, p. 381-389. In Russian. refs

A method is developed for the multifaceted evaluation of the condition, endurance, and work capacity of athletes of various specialties and qualifications by determining the level in the blood and urine of hormones and mediators, their precursors, and metabolites of the humoral-hormonal systems. A marked parallelism is found between indicators of humoral-hormonal mechanisms of the regulation of functions in an athlete and the physical potential, athletic form, effectiveness of the exerted force, and the results obtained during training and competition. Criteria are developed for evaluating the activity of the humoral-hormonal systems which can be used to predict the performance of athletes during athletic activities. It is found that physiological and biochemical shifts during athletic activities (especially during prolonged activities consist of successive phase periods) which are distinguished by specific characteristics of humoral-hormonal activity. The ergotropic (catabolic) phase during prolonged athletic activity is replaced by the trophotropic (anabolic) phase and vice versa. N.B.

A83-35905

THE DIRECTED CORRECTION OF BIORHYTHMICAL STRUCTURE OF MOVEMENTS IN ATHLETES [NAPRAVLENNIA KORREKTSIIA BIORITMOLOGICHESKOI STRUKTURY DVIZHENII U SPORTSMENOV]

O. V. BOGDANOV and N. N. VASILEVSKII (Akademii Meditsinskikh Nauk SSSR, Leningrad, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, May-June 1983, p. 390-395. In Russian. refs

The possibility of the directed correction of motor skills was investigated in young athletes using the bioelectrical activity of muscles which participate in executing a biorhythmical structure. The electrical activity of the controlling muscle was regulated in order to direct the training of the temporal parameters of the muscles' work. An acoustical or visual signal was used to indicate deviations from the correct execution of the movements. It was found that the correction of the biorhythmical movement and the formation of new, correct motor skills are composed of three stages. The first stage is characterized by the correct interaction of muscles during the execution of the auxiliary elements of movement. The second stage is the formation of the main element of the biorhythmical structure of the movement. The third stage includes the correction of additional elements when necessary and reinforces the correct execution of the biorhythmical structure of the movement. N.B.

A83-35906

THE EFFECT OF ALIMENTARY ALKALEMIA ON THE MAXIMUM DURATION OF ANAEROBIC WORK AND THE CONCENTRATION OF LACTATE IN THE MUSCLES AND BLOOD [VLIANIE ALIMENTARNOI ALKALEMII NA PREDEL'NUII PRODOLZHITEL'NOST' ANAEROBNOI RABOTY I SODERZHANIE LAKTATA V MYSHTSAKH I KROVI]

I. A. M. KOTS, E. V. OZOLINA, and O. L. VINOGRADOVA (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, May-June 1983, p. 396-401. In Russian. refs

The effect of artificial alkalosis caused by the peroral application of sodium bicarbonate was investigated in healthy male athletes in order to determine the localization and the mechanisms of the action of lactate during anaerobic work. It was found that the peroral application of sodium bicarbonate at a dose of 0.3 g/kg body weight increased the physical anaerobic work capacity. Following the conclusion of anaerobic work, the concentration of lactate in the muscles during alimentary alkalemia was equivalent to that of the control group, while the concentration of lactate in the blood was higher. These results indicate that the peroral application of sodium bicarbonate evokes an increased outflow of lactate from the muscle cells into the blood. The mechanism of this reaction is probably linked with an increase in the buffer capacity of the blood and muscles tissues which decreases the degree of work acidosis. In addition, it is found that the concentration of lactate in the muscles is not the critical limiting factor which determines the point of work stoppage. N.B.

A83-35907

THE EFFECT OF MAXIMUM PHYSICAL WORK ON THE CARDIODYNAMICS AND MICROCIRCULATORY BED OF YOUNG ATHLETES AND OF INDIVIDUALS NOT PURSUING ATHLETIC ACTIVITIES [VLIANIE PREDEL'NOI FIZICHESKOI RABOTY NA KARDIODINAMIKU I MIKROTSIRKULIATORNOE RUSLO IUNYKH SPORTSMENOV I LITS, NE ZANIMAUSHCHIKHSIA SPORTOM]

A. S. MOZZHUKHIN, V. M. BOEV, and S. V. KONOVALOV (Leningradskii Institut Fizicheskoi Kul'tury, Leningrad, Orenburgskii Meditsinskii Institut, Orenburg, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, May-June 1983, p. 402-405. In Russian. refs

A83-35908

RESERVES OF THE RESPIRATORY SYSTEM UNDER VARIOUS CONDITIONS OF AEROBIC PRODUCTIVITY [REZERVY DYKHATEL'NOI SISTEMY PRI RAZLICHNYKH UROVNIAX AEROBNOI PROIZVODITEL'NOSTI]

S. N. KUCHKIN (Volgogradskii Institut Fizicheskoi Kul'tury, Volgograd, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, May-June 1983, p. 406-416. In Russian. refs

The significance of the various categories of the respiratory system reserves in increasing the level of aerobic productivity is investigated, and the values of the main indicators of respiratory function during various levels of aerobic capabilities are determined. Various indicators of the respiratory system were studied in 153 athletes, including maximum O₂ uptake, maximum pulmonary ventilation, and the pulmonary vital capacity. It is found that the increase in the level of aerobic productivity due to regular physical training is accompanied by improvements in the functional capabilities of the respiratory system. The adaptation of the respiratory system during an increased level of aerobic productivity is composed of stages which include various reserve categories of power, mobilization ability, and effectiveness. N.B.

A83-35909

ADRENOCORTICAL ACTIVITY IN ATHLETES AFTER REPEATED PHYSICAL LOADS DURING THE COURSE OF THE DAY [ADRENOKORTIKAL'NAIA AKTIVNOST' U SPORTSMENOV PRI MNOGOKRATNYKH FIZICHESKIKH NAGRUZKAKH V TEHNIE DNIA]

R. V. IALAK and A. A. VIRU (Tartuskii Gosudarstvennyi Universitet, Tartu, Estonian SSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, May-June 1983, p. 417-421. In Russian. refs

A83-35910

HEMODYNAMIC SHIFTS IN RESPONSE TO ISOMETRIC LOADS IN HUMANS IN THE CASE OF VARIOUS INITIAL INDICATORS OF SYSTEMIC BLOOD CIRCULATION [SDVIGI GEMODINAMIKI NA IZOMETRICHESKUII NAGRUZKU U CHELOVEKA PRI RAZLICHNYKH ISKHODNYKH POKAZATELIAKH SISTEMNOGO KROVOOBRAZHCENIIA]

L. P. LARIKOVA, B. G. BERSHADSKII, and T. A. EVDOKIMOVA (Leningradskii Meditsinskii Institut, Leningrad, USSR) Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, May-June 1983, p. 442-448. In Russian. refs

A83-35911

THE MECHANISM WHICH PROVIDES FOR UREA REMOVAL AFTER PROTEIN LOADS [O MEKHANIZME, OBESPECHIVAIUSHCHEM VYVEDENIE MOCHEVINY POSLE BELKOVYKH NAGRUZOK]

I. S. BALAKHOVSKII and T. A. ORLOVA (Fiziologiya Cheloveka (ISSN 0131-1646), vol. 9, May-June 1983, p. 449-453. In Russian. refs

The effect of an increased production of urea on the concentration of urea in the blood and the mechanism of its removal from the body is investigated in a clinical situation in which the load is provided by an increase in protein consumption. The clearance of urea from the kidneys and the concentration of urea in the blood were determined in eight healthy male subjects who consumed a normal diet supplemented with 250-500 g/day of a high-protein food (cottage cheese). Results show that a protein load leads to an increase in the clearance of urea with not change in the clearance of creatine, which may be linked with a limitation of the reabsorbed fraction of the filtered material. From 4-8 hr after the protein load, the concentration of urea in the blood increases, but it returns to normal after about 24 hr. Only one-half of a load containing 1 mole of nitrogen from protein is metabolized by the body, with the other half probably being deposited. N.B.

A83-35912

THE CHARACTERISTICS OF THERMOREGULATION AND BLOOD CIRCULATION DURING PROLONGED EXPOSURE TO LOW TEMPERATURE [SOBENNOSTI TERMOREGULIATSII I KROVOOBRASHCHENIIA PRI PRODOLZHITEL'NOM VOZDEISTVII PONIZHENNYKH TEMPERATUR]

M. IU GEDYMIN, D. M. DEMINA, M. N. EVLAMPIEVA, I. S. KANDROR, A. G. LEKSIN, and E. M. RATNER (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Zheleznodorozhnoi Gigeny, Moscow, USSR) *Fiziologiya Cheloveka* (ISSN 0131-1646), vol. 9, May-June 1983, p. 465-470. In Russian. refs

A comparative investigation of the thermoregulatory reactions of humans and several indicators of the functioning of the cardiovascular system was conducted in order to determine the effect of chronic low temperatures on the process of acclimatization to cold. Two groups of 10 individuals each were studied in each of two regions of the USSR during the winter: construction workers building a tunnel and workers in an open-pit mine in Siberia and Georgia. The outside temperature varied from -11 to 15 C in Siberia and from -2 to 7 C in Georgia. Results show that the conservation and recovery of the temperature homeostasis after general cooling of the body in individuals working in conditions of low temperatures occurs through the participation of 'strategic' mechanisms of the control of temperatures regulation and blood circulation. In workers in the open air, this process is accomplished primarily through 'operative' mechanisms which are more expedient and adequate from a physiological perspective. N.B.

A83-35913

RESULTS OF AN EXPERIMENTAL VERIFICATION OF THE 'LAW' OF INITIAL VALUE [REZULTATY EKSPERIMENTAL'NOI PROVERKI 'ZAKONA' ISKHODNOGO UROVNIA]

V. V. ROMANOV and I. N. CHERNOVA (Kalininskii Politehnicheskii Institut, Kalinin, USSR) *Fiziologiya Cheloveka* (ISSN 0131-1646), vol. 9, May-June 1983, p. 481-487. In Russian. refs

The 'law' of initial value (Wilder, 1950) is examined experimentally in individuals performing physical and mental tasks and a formula is developed which allows changes of physiological reactions to be predicted quantitatively. Indicators of the cardiovascular system and the respiratory system were studied in athletes before, during, and after exercise on a bicycle ergometer. Also studied were the blood pressure and heart rate of subjects during the performance of a complex visual-motor reaction. Results show that no reliable displays of the 'law' of initial value consisting of the decrease of vegetation reactions during higher background values of physiological parameters were observed in experiments with physical loads. In experiments with mental loads, smaller changes of the heart rate were observed in conditions of higher background values, which agreed with the 'law' of initial values. It is concluded that the physiological basis of the 'law' of initial value is the interaction toward the preservation and recovery of the homeostatic constants of the body. N.B.

A83-35914

BEHAVIORAL THERMOREGULATION [POVEDENCHESKAIA TERMOREGULIATSIIA]

IU. N. CHUSOV (Vladimirskii Gosudarstvennyi Pedagogicheskii Institut, Vladimir, USSR) *Fiziologiya Cheloveka* (ISSN 0131-1646), vol. 9, May-June 1983, p. 488-491. In Russian. refs

The effect of low temperatures on the regulation of behavior in humans during everyday conditions was investigated. The number of pedestrians, the clothing they wore, their speed of walking, and their character of walking (in groups, singly) were recorded at three times during the day (11:00-11:30, 17:30-18:00, 20:30-21:00). Data for over 200,000 individuals was evaluated according to the external air temperature at each of the three periods. Results show that the number of pedestrians sharply fell with decreasing temperature for the morning and evening hours, while it fell less sharply for the late afternoon period. In all periods of observation, the declines in the number of pedestrians with lower temperatures were largely due to the decreases in the number of children and old elderly individuals. In addition, it was found that the speed of walking increased and the number of people

walking in groups decreased as the external temperature decreased. N.B.

A83-35915

AN INVESTIGATION OF THE RECOGNITION ABILITY BEFORE AND AFTER VARIOUS VISUAL LOADS [ISSLEDOVANIIE SPOSOBNOSTI K RASPOZNAVANIUI DO I POSLE RAZLICHNOI ZRITEL'NOI NAGRUZKI]

N. B. KOSTELIANETS, IU. I. LEVKOVICH, and M. IA. TROITSKAIA (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) *Fiziologiya Cheloveka* (ISSN 0131-1646), vol. 9, May-June 1983, p. 494, 495. In Russian. refs

The mechanisms of visual fatigue are studied in conditions using presentations of filmed images to groups of subjects. It was found that there was no effect of fatigue on the accuracy of recognition of the filmed images before and after viewing the complete film with various emotional loads. About 20 percent of the 114 subjects exhibited a recognition accuracy of lower than 0.4. The remainder recognized the stimuli correctly with an accuracy of 0.4-0.75 and these subjects can be divided into two groups: rapidly and slowly trained subjects (25 and 55 percent, respectively). It is concluded that these results and methods can be used for the selection of individuals for jobs involving high levels of visual stress. N.B.

A83-35916

ERYTHROPOIESIS DURING ADAPTATION TO COLD [ERITROPOEZ PRI ZAKALIVANII K KHOLODU]

M. A. BUTOV (Riazanskii Meditsinskii Institut, Ryazan, USSR) *Fiziologiya Cheloveka* (ISSN 0131-1646), vol. 9, May-June 1983, p. 497-499. In Russian. refs

Several indicators of erythropoiesis were investigated in individuals living in the northern regions of the USSR who executed various procedures for adapting to cold weather conditions. The study determined several indicators of erythropoiesis including hemoglobin content, circadian erythropoiesis, and the average erythrocyte lifetime in 33 individuals, 16-72 years of age, who performed various types of physical exercise out of doors 3 times a week for 1 hr each session. An increased intensity of erythropoiesis was found in subjects regularly exposed to cold conditions. The degree of increased erythropoiesis depended on the character and intensity of the adaptation procedure. For example, three of the five indicators of erythropoiesis investigated were higher in subjects who went swimming in cold conditions than in the other groups. However, the increased erythropoiesis observed for these swimmers was not accompanied by the appearance of erythrocytes with decreased lifespans in the blood vessels. N.B.

A83-36813

THE INDIVIDUAL VARIABILITY OF THE PUTAMEN OF THE BRAIN IN HUMANS [INDIVIDUAL'NAIA IZMENSHIVOST' SKORLUPY /PUTAMEN/ MOZGA CHELOVEKA]

V. P. ZVORYKIN (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Arkhiv Anatomii, Gistologii i Embriologii* (ISSN 0004-1947), vol. 84, Jan 1983, p. 21-24. In Russian. refs

The volume of the putamen was measured in individuals of both sexes of various ages (21 individuals, 27 hemispheres) using microscopic cytoarchitectonic methods. It is found that the distribution of putamen variants is not connected with brain weight or age. The extreme variants have a volume difference of 3.7 times. These results indicate that the changes in the internal and external structures of the brain are not proportional. In addition, substantial differences in the size of the putamen in different hemispheres of the same subject were found. N.B.

A83-36815

NECROTIC EPITYMPANITIS COMPLICATED BY PARESIS OF THE FACIAL NERVE AND LABYRINTHITIS [NEKROTICHESKII EPITIMPANIT, OSLOZHENNYI PAREZOM LITSEVOGO NERVA I LABIRINTITOM]

L. I. TSUKERBERG and V. P. VASILEVA (I Moskovskii Meditsinskii Institut, Moscow, USSR) Vestnik Otorinolaringologii (ISSN 0042-4668), Jan-Feb. 1983, p. 80,81 In Russian

A83-36817

THE CALCULATION OF CONTROLLED EYE MOVEMENTS DURING SHIFTS OF THE FIXATION POINTS [K RASCHETU UPRAVLIAEMYKH DVIZHENII GLAZ PRI SMENE TOCHEK FIKSATSII]

IU A. IVLIEV Psikhologicheskii Zhurnal, vol. 4, Jan.-Feb. 1983, p. 38-50. In Russian. refs

A theoretical study is presented of the human eye movements, known as saccadic eye movements, during the shift of fixation points. It is shown that at least for small eye jumps which satisfy the formula of Iarbus (1965), the revolution of the eye during the jump is optimal for rapid actions. A theoretical formula is obtained for the eye revolution, the speed and acceleration of the jump during the movement, and their maximum values, as well as a formula for determining the time of the jump and the frequency of the eye movement system. It is concluded that the eye movement system can be characterized as an extremal self-tuning parametric system. Also examined are the various forms of eye jumps based on the presence of relaxation mechanisms of the eye movement system. N.B.

A83-36821

DIFFERENTIAL LOUDNESS SENSITIVITY, THE STRENGTH OF THE NERVOUS SYSTEM, AND THE PSYCHOPHYSIOLOGICAL SCALE OF LOUDNESS [DIFFERENTIAL'NAIA GROMKOSTNAIA CHUVSTVITEL'NOST', SILA NERVNOI SISTEMY I PSIKHOFIZICHESKIE SHKALY GROMKOSTI]

T. A. RATANOVA Voprosy Psikhologii (ISSN 0042-8841), Jan.-Feb. 1983, p. 122-129. In Russian. refs

The individual differences in differential loudness sensitivity for weak sound (40 dB) and for highly intense sound (120 dB) are studied in 28 subjects, 19-25 years of age. The connections of the loudness differential sensitivity with the characteristics of the strength of the nervous system and with the character of the individual psychophysical scale of loudness are also examined. Results show that the subjects who differ according to the strength of the nervous system with regard to excitation, have psychophysical scales for the loudness of sounds which differ by various ranges. Individuals with strong nervous systems are characterized by a lengthening of the loudness scale (beginning lower and ending higher), while individuals with a weak nervous system are characterized by a shortening of the scale (beginning higher and ending lower). In addition, a feedback relationship is found in the majority of subjects between the values of d' (an indicator of the individual loudness differentiation sensitivity) for weak sounds (40 dB) and for high-intensity sounds (120 dB). A direct connection is found in 30 percent of the subjects between the indicator of differentiation sensitivity in regions of weak and strong sounds. N.B.

A83-36822

AN INVESTIGATION OF DIFFERENTIAL SENSITIVITY IN THE VISUAL PERCEPTION PROCESS IN NORMAL INDIVIDUALS AND IN PATIENTS WITH SCHIZOPHRENIA [ISSLEDOVANIE DIFFERENTIAL'NOI CHUVSTVITEL'NOSTI V PROTSESSE ZRITEL'NOGO VOSPRIYATIYA V NORME I U BOL'NYKH SHIZOFRENIEI]

K. V. BARDIN and N. G. TOTROVA Voprosy Psikhologii (ISSN 0042-8841), Jan.-Feb. 1983, p. 119-122. In Russian. refs

A83-36826

THE PATTERN OF THE FUNCTIONAL CONDITION OF THE VESTIBULAR ANALYZER IN PATIENTS WITH CERVICAL OSTEOCHONDROSIS COMBINED WITH A VERTEBRAL ARTERY SYNDROME [O DINAMIKE FUNKTSIONAL'NOGO SOSTOYANIYA VESTIBULIARNOGO ANALIZATORA U BOL'NYKH SHEINYM OSTEOKHONDROZOM S SINDROMOM POZVONOCHNOI ARTERII]

V. I. BABIIAK and V. N. FILIMONOV (Voenno-Meditsinskaya Akademiya, Leningrad, USSR) Zhurnal Ushnykh, Nosovykh i Gorlovnykh Boleznay (ISSN 0044-4650), Jan.-Feb. 1983, p. 48-52. In Russian. refs

A83-36828

CERTAIN CHARACTERISTICS OF THE METABOLISM OF HEXOSEPHOSPHATES [NEKOTORYE OSOBENNOSTI METABOLIZMA GEKSOZOFOSFATOV V EKSTRAKTAKH KROVIANYKH PLASTINOK CHELOVEKA]

S. A. MAKAROV and A. I. KOLOTILOVA (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR) Voprosy Meditsinskoi Khimii (ISSN 0042-8809), vol. 29, Jan.-Feb. 1983, p. 69-71 In Russian. refs

The metabolism of fructose phosphates and their products are investigated using extracts of human thrombocytes. Results show that glucosephosphate isomerase plays an important factor in the metabolism of fructose-6-phosphate in extracts of human thrombocytes, transforming fructose-6-phosphate into a substrate for oxidation reactions by the pentosephosphate pathway. In addition, the increased concentration of NADP observed during the incubation of blood platelets is evidence for the inclusion of fructose-6-phosphate in the pentosephosphate cycle through the glucosephosphate isomerase reaction. N.B.

A83-36831

UDP-COENZYMES IN THE TISSUES OF THE BRAIN GLIA OF HUMANS [UDF-KOFERMENTY V TKANI GLIOM MOZGA CHELOVEKA]

G. M. POPOVA (Akademiya Meditsinskikh Nauk SSSR, Moscow, USSR) Voprosy Meditsinskoi Khimii (ISSN 0042-8809), vol. 29, Jan.-Feb. 1983, p. 20-23. In Russian. refs

The concentration of the UDP-coenzymes UDP-glucose (UDPG) and UDP-N-acetylglucose amine (UDPAG) in tissues of glial tumors of the brain of humans at various degrees of dedifferentiation were investigated. Results show that the ratio of the concentrations of UDPAG to UDPG increased from a value of about 1 in normal tissues to about 2 or 3 in dedifferentiated tumor tissues. In addition, while the ratio of UDPAG to UDPG was found to have a ratio of 2.4 in dedifferentiated tumors, this ratio dropped to 1.6 in the region surrounding the tumor. It is concluded that the ratio of UDPAG to UDPG in dedifferentiated tumors is a reflection of the character of the growth of the tumors. N.B.

A83-36832

COMPUTER TOMOGRAPHY IN THE DIAGNOSIS OF CRANIO-CEREBRAL INJURIES [KOMP'YUTERNAIA TOMOGRAFIYA V DIAGNOSTIKE CHEREPNO-MOZGOVOI TRAVMY]

A. N. KONOVALOV, V. N. KORNIEENKO, N. IA. VASIN, O. V. GAEVYI, V. A. KUZMENKO, and V. E. KHODIEV (Akademiya Meditsinskikh Nauk SSSR, Moscow, USSR) Voprosy Neurokhirurgii (ISSN 0042-8817), Jan.-Feb. 1983, p. 3-12. In Russian. refs

A83-36835

MATHEMATICAL MODELLING IN STUDIES OF THE PATHOLOGY OF THE VISUAL NERVE [MATEMATICHESKOE MODELIROVANIE V IZUCHENII PATOLOGII ZRITEL'NOGO NERVA]

T. I. EROSHEVSKII and S. IA. BRANCHEVSKAIA (Kuibyshevskii Meditsinskii Institut, Kuibyshev, USSR) Kazanskii Meditsinskii Zhurnal, vol. 64, Jan.-Feb. 1983, p. 42-44. In Russian. refs

A83-36836

BASAL INSULINEMIA IN HEALTHY MALES AND IN MALES WITH ISCHEMIC HEART DISEASE OF 20-59 YEARS OF AGE (POPULATION STUDY) [BAZAL'NAIA INSULINEMIA U ZDOROVYKH I BOL'NYKH ISHEMICHESKOI BOLEZN'IU SERD TSA MUZHCHIN 20-59 LET /POPULIATSIONNOE ISSLEDOVANIE/]

A. G. MAZOVETSKII, I. I. SUNTSOV, E. N. GERASIMOVA, G. S. ZHUKOVSKII, V. A. POLESSKII, V. V. KONSTANTINOV, V. P. MASENKO, A. V. GORELYI (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR), and A. I. A. ZADOIA (Sovetskaia Meditsina, no. 1, 1983, p. 7-11. In Russian. refs)

The level of total cholesterol, high-density lipoprotein cholesterol, triglycerides, and immunoreactive insulin were determined in 983 men, 20-59 years of age, who lived in Moscow. The cholesterol coefficient atherogeneity was calculated in order to evaluate the risk of developing atherosclerosis. It is determined that with increased levels of insulin in the blood, the concentration of cholesterol and triglycerides increases, while the concentration of high-density lipoprotein cholesterol decreases. A statistically significant correlation was found between these indicators which confirms the presence of a physiological connection between the levels of lipids and the concentration of insulin. In addition, it is found that the incidence of ischemic heart disease depends on the level of basal insulinemia. The significance of the excessive secretion of insulin in the development of lipid metabolism disorders is examined as a risk factor for the development of atherosclerotic changes in the blood vessels in the cases of diabetes and ischemic heart disease. N.B.

A83-36837

METHODS FOR DETERMINING THE EXTENT OF MYOCARDIAL INFARCTION [METODY OPREDELENIIA RAZMEROV INFARKTA MIOKARDA]

V. N. ORLOV and N. A. SHILOVA (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR) (Sovetskaia Meditsina, no. 1, 1983, p. 52-55. In Russian. refs)

A review is presented of various methods used to determine the extent of myocardial infarcts which can be utilized to predict the course of the illness and its lethality. Methods examined include the precordial electrocardiographic mapping method, the serial investigation of creatine phosphokinase in the blood serum, and radionuclide methods. Precordial electrocardiographic mapping is an effective clinical method and can be used to predict the course of the illness and potential complications, including pericarditis, aneurysms, and cardiac insufficiencies. The serial determination of creatine phosphokinase allows the size of the myocardial infarct to be evaluated during the first few days of the illness, gives information about the dynamics of the illness, and can be employed to evaluate the effectiveness of the treatments for the disease. N.B.

A83-36838

THE APPLICATION OF NONINVASIVE METHODS FOR THE STUDY OF PATIENTS WITH ISCHEMIC HEART DISEASE [ISPOL'ZOVANIE NEINVAZIVNYKH METODOV ISSLEDOVANIIA U BOL'NYKH ISHEMICHESKOI BOLEZN'IU SERD TSA]

V. V. ZARETSKII, I. S. ASLIBEKIAN, A. A. KIRICHENKO, I. I. KOZLOVA, and L. N. IVANOVA (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) (Sovetskaia Meditsina, no. 1, 1983, p. 3-7. In Russian. refs)

A study is presented of the use of spiroergometry and polycardiography for evaluating the coronary and myocardial reserves of the heart in patients with ischemic heart disease and angina pectoris. A correlation is found between the incidence of cardiorespiratory disorders and the quantity of coronary artery lesions. The degree of the decrease in the ST interval is found to correspond to the decrease in the strength and work of the heart per 1 kg body mass, the decrease in the indicators of maximal consumption of oxygen per 1 kg body mass and the 'oxygen pulse' during loads, and the increase of the ratio of the oxygen debt to the oxygen demand. In the group of patients with ischemic heart disease but without coronary artery lesions, significant

deviations from the normal values were also observed which indicated the presence of a pathological mechanism of regulation. Polycardiographic data indicated that the contractile function was more disrupted in patients with ischemic heart disease and heart aneurysms. An additional sign of the severity of coronary vessel lesions might be the lengthened expulsion phase in response to a load. N.B.

A83-36842

SEVERAL INDICATORS OF THE FUNCTIONAL CONDITION OF THE IMMUNE SYSTEM IN NORMAL AND PATHOLOGICAL SITUATIONS [NEKOTORYE POKAZATELI FUNKSIONAL'NOGO SOSTOIANIIA IMMUNNOI SISTEMY V NORME I PATOLOGII]

V. P. DYGIN (Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Jan. 1983, p. 31-36. In Russian. refs)

A review is presented of research concerning the connection of the system of adaptation and the immune system as a unified complex which provides for the defense of the body from extreme (stressful) actions. Attention is focused on the immunological problems related to the negative influence often caused in humans by various factors of military activity. Topics considered include the immunological reactions to radiation exposure, thermal shock, burns, hypodynamics and hypokinesia, and acute mechanical trauma. N.B.

A83-36843

THE COLD STERILIZATION OF SURGICAL MATERIALS AND THE CLEANING OF THE SURGEON'S HANDS ON SEA VESSELS DURING PROLONGED VOYAGES [KHOLODNAIA STERILIZATSIIA KHIRURGICHESKIKH MATERIALOV IS OBRABOTKA RUK KHIRURGA NA KORABLIKHX V USLOVIIAKH DLITEL'NOGO PLAVANIIA]

P. A. MELEKHOV, A. V. KRASILNIKOV, and A. V. LAPIN (Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Jan. 1983, p. 56, 57. In Russian.)

N83-26406# Mississippi Univ., Jackson. Dept. of Pharmacology and Toxicology.

ORGANIZATIONAL EFFECTS OF HORMONES AND HORMONALLY-ACTIVE XENOBIOTICS ON POSTNATAL DEVELOPMENT

C. A. LAMARTINIERE, T. SLOOP, J. CLARK, H. A. TILSON, and G. W. LUCIER. In Calif. Univ. Proc. of the 12th Conf. on Environ. Toxicol. p 96-121. Apr. 1982. refs

(PAPER-6) Avail. NTIS HC A16/MF A01 CSCL 06C

Steroid hormones and xenobiotics were studied to determine their capability of exerting permanent irreversible modifications early in life that would result in alterations in endocrine secretion, behavior, reproduction or predispose the individual to cancer or to other biochemical insult. B.G.

N83-26407# Cincinnati Univ., Ohio. Dept. of Environmental Health.

MALE VS. FEMALE MEDIATED TERATOGENESIS

J. M. MANSON. In Calif. Univ. Proc. of the 12th Conf. on Environ. Toxicol. p 122-139. Apr. 1982. refs

(PAPER-7) Avail. NTIS HC A16/MF A01 CSCL 06C

Different types of reproductive dysfunction with exposure of males and females during different stages of the reproductive process were correlated. It is a well-established principle that teratogenic exposure of the pregnant female, and thus of the embryo, during the organogenesis period of development can lead to birth defects in the offspring. The outcome of this exposure paradigm, as well as the outcomes associated with exposure during other stages of the reproductive process that have received less experimental attention are discussed. Insult to the germ cells of the male during spermatogenesis and to the female during oogenesis can also lead to reproductive dysfunction. The type of adverse outcome, however, is quite different from that occurring with embryonic exposure during the organogenesis period. An overview of this area will be given with the intent of focusing on

those types of reproductive dysfunction that are most relevant to environmental exposure of men and women. Author

N83-26410# Air Force Occupational and Environmental Health Lab., Brooks AFB, Tex. Industrial Hygiene Branch
AN INDUSTRIAL HYGIENIST'S VIEW: RELATIONSHIPS BETWEEN INDUSTRIAL HYGIENE SAMPLING, HUMAN EXPOSURE STANDARDS, AND EXPERIMENTAL TOXICOLOGY

J. C. ROCK *In Calif. Univ. Proc. of the 12th Conf. on Environ. Toxicol.* p 164-191 Apr. 1982 refs
 (PAPER-11) Avail: NTIS HC A16/MF A01 CSCL 06C

One industrial hygiene specialty is the evaluation of hazards posed by small concentrations of toxic materials in the workplace air. A variety of instruments are used to measure the average concentration over specified periods of time. These measured concentrations are then compared with exposure standards to judge the quality of the workplace. Much was written about proper statistical sampling strategies to insure that workplaces meet established exposure standards. Much less was written about whether or not exposure standards are created in such a fashion that a workplace which is in compliance is in fact as safe and healthful as described. This is an interdisciplinary question lying between industrial hygiene and environmental toxicology. The environmental toxicology community is provided with some food for thought from the perspective of one member of the industrial hygiene community. Author

N83-26411# Air Force Occupational and Environmental Health Lab., Brooks AFB, Tex.
EVALUATING HEALTH HAZARDS ASSOCIATED WITH AIRCRAFT FUEL CELL MAINTENANCE

E. C. BISHOP *In Calif. Univ. Proc. of the 12th Conf. on Environ. Toxicol.* p 192-202 Apr. 1982 refs
 (PAPER-12) Avail: NTIS HC A16/MF A01 CSCL 06C

Problems commonly encountered when toxicologic standards are applied to everyday worker exposures are demonstrated. The primary function of the industrial hygienist is to evaluate the workplace to insure a healthful environment for the worker. In general, this evaluation is accomplished by taking samples representative of the worker's environment, analyzing for contaminants of interest, and comparing the measured levels with appropriate standards. Control measures are instituted if contaminant levels are above the standard or some present fraction of the standard (NIOSH action level concept). Although the evaluation procedure may seem simple as described, it is a nontrivial task as demonstrated using the example of a recent evaluation of worker exposures during aircraft fuel cell maintenance. Author

N83-26412# Delaware Univ., Newark. Toxicology Research Lab.
PHARMACOKINETIC EVALUATIONS IN RELATION TO USE OF TOXICOLOGICAL DATA

J. C. RAMSEY *In Calif. Univ. Proc. of the 12th Conf. on Environ. Toxicol.* p 234-249 Apr. 1982 refs
 (PAPER-15) Avail: NTIS HC A16/MF A01 CSCL 06C

Dose-response and interspecies relationships, principles, and a hypothetical illustration are provided. The impact of the transition from linear to nonlinear pharmacokinetics upon the dose versus response curve is discussed. Author

N83-26413# Delaware Univ., Newark. Dept. of Chemical Engineering.
A PHYSIOLOGICALLY-BASED PHARMACOKINETIC MODEL FOR 2,5-HEXANEDIONE

M. J. ANGELO and K. B. BISCHOFF *In Calif. Univ. Proc. of the 12th Conf. on Environ. Toxicol.* p 250-286 Apr. 1982 refs
 (PAPER-16) Avail: NTIS HC A16/MF A01 CSCL 06C

Toxicity of 2,5 hexanedione, single bolus dose studies, multiple bolus dose studies, constant intravenous infusion, a lumped reaction scheme for 2,5 hexanedione metabolism, model

parameters, single dose exposure, urinary excretion, and multiple dose exposures are discussed. Author

N83-26414# National Inst. of Health, Bethesda, Md. Biomedical Engineering and Instrumentation Branch.
PHYSIOLOGICAL MODELING OF ENTERIC TRANSPORT

P. M. BUNGAY, R. L. DEDRICK, and H. B. MATTHEWS *In Calif. Univ. Proc. of the 12th Conf. on Environ. Toxicol.* p 287-298 Apr. 1982 refs
 (PAPER-17) Avail: NTIS HC A16/MF A01 CSCL 06C

A mathematical model of gut absorption and secretion for lipophilic agents based on a physiological pharmacokinetic approach to investigating enteric transport is developed. The findings from an analysis are summarized to illustrate the utility of the model. Author

N83-26415# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio. Toxic Hazards Div.
PHYSIOLOGICAL PHARMACOKINETIC MODELS FOR THE INHALATION OF GASES AND VAPORS

M. E. ANDERSEN *In Calif. Univ. Proc. of the 12th Conf. on Environ. Toxicol.* p 299-316 Apr. 1982 refs
 (PAPER-18) Avail: NTIS HC A16/MF A01 CSCL 06C

Metabolically inert gases and vapors; metabolized gases and vapors; and a preliminary physiological model of the uptake, distribution, metabolism and elimination of vapors are discussed. Author

N83-26423# Joint Publications Research Service, Arlington, Va.
ELECTROSTATIC SHIELDING AGAINST COSMIC RADIATION (CURRENT STATUS AND PROSPECTS)

T. Y. RYABOVA *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 2, Mar. - Apr. 1983 (JPRS-83467) p 2-6 13 May 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 2, Mar. - Apr. 1983 p 4-7
 Avail: NTIS HC A07

Conduction currents of the vacuum atmosphere near the spacecraft were measured in an electrostatic shielding and an electrostatic shielding module in electrostatic fields of about 10 to the 7th power Vt/m at a voltage of 3x10 to the 5th power V onboard Cosmos-605, 690, 732 and 936. The resultant conduction currents give evidence that the vacuum environment has high electroinsulation properties which contradicts the concepts derived from ground based studies. Using up to date high voltage devices, it appears possible to develop an efficient electrostatic shielding which will be of a low weight and a low power consumption. Author

N83-26424# Joint Publications Research Service, Arlington, Va.
POSSIBLE DIRECTIONS OF REFINING CRITERIA OF RADIATION SAFETY OF SPACEFLIGHTS

Y. Y. KOVALEV, V. M. PETROV, V. A. SAKOVICH, and M. A. SYCHKOV *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 2, Mar. - Apr. 1983 (JPRS-83467) p 7-14 13 May 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 2, Mar. - Apr. 1983 p 8-14
 Avail: NTIS HC A07

The possibility of characterizing space flight radiation safety is considered using a value which is integrated over the flight time, takes into account the radiation processes in an irradiated body and averages the probability of adverse radiobiological effects with respect to the distribution of solar proton flares of varying intensity. The proposed characteristic is compared with the current standards with reference to a hypothetical interplanetary flight. Author

N83-26426# Joint Publications Research Service, Arlington, Va. EFFECT OF 140-DAY FLIGHT ON BLOOD AMINO ACID LEVELS IN COSMONAUTS

I. G. POPOV and A. A. LATSKEVICH *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 2, Mar. - Apr. 1983 (JPRS-83467) p 29-38 13 May 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 2, Mar. - Apr. 1983 p 23-30
 Avail. NTIS HC A07

The results of studying 17 free amino acids in the plasma of the 140 day Salyut 6 crewmembers are presented. The measurements were carried out by means of a Hitachi KLA-3B amino acid analyzer. The data obtained give evidence that the dietary intake of amino acids before and during flight should be better controlled, the dietary content of amino acids should be enriched with certain amino acids (primarily methionine and cystine) and more adequately balanced. It is recommended to select space diets on an individual basis, taking into consideration anthropometric and metabolic characteristics of cosmonauts

Author

N83-26428# Joint Publications Research Service, Arlington, Va. PHYSICAL STATUS AND BIOCHEMICAL PARAMETERS OF OBESE PILOTS AFTER IMPLEMENTATION OF PREVENTATIVE MEASURES

H. LYSON-WOJCECHOWSKA, M. PENDZIWIATR, Z. KOTER, and K. KWARECKI *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 2, Mar. - Apr. 1983 (JPRS-83467) p 46-49 13 May 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 2, Mar. - Apr. 1983 p 35-37

Avail. NTIS HC A07

The results of comprehensive examination (medical, anthropological, biochemical investigations and exercise tests) of obese pilots treated in specialized centers to make them lose weight are presented

Author

N83-26429# Joint Publications Research Service, Arlington, Va. EFFECT OF SEVEN-DAY SPACEFLIGHT ON STRUCTURE AND FUNCTION OF HUMAN LOCOMOTOR SYSTEM

R. HERNANDEZ-KORWO, I. B. KOZLOVSKAYA, Y. V. KREYDICH, S. MARTINEZ-FERNANDEZ, A. S. RAKHMANOV, E. FERNANDEZ-PONE, and V. A. MINENKO *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 2, Mar. - Apr. 1983 (JPRS-83467) p 50-58 13 May 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 2, Mar. - Apr. 1983 p 37-44

Avail. NTIS HC A07

The support properties of the foot arch in weightlessness induced motor changes and their prevention with the help of the Cupula Sand-501 device were studied. Comparison of the responses of the crewmembers shows that support simulation diminished the level of many of the adverse effects of zero g in the Cuban pilot who used the prophylactic device. It is suggested that the efficiency of the device is due to its activation of the system of support reactions. The mechanisms of the effects of weightlessness on the structure and function of the bones and joints in humans are discussed

Author

N83-26430# Joint Publications Research Service, Arlington, Va. POSTURAL HEMODYNAMIC CHANGES FOLLOWING SHORT-TERM SPACEFLIGHTS

T. D. VASILYEVA, K. K. YARULLIN, and V. I. ZHUYKO *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 2, Mar. - Apr. 1983 (JPRS-83467) p 59-64 13 May 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 2, Mar. - Apr. 1983 p 44-48

Avail. NTIS HC A07

Variations in the pulse blood content and tone of cerebral vessels, vertebrobasilar system, lungs and legs during the antiorthostatic tests were examined rheographically in 14 cosmonauts after 8-day space flights. The results of adaptation of the vascular system to zero-g which included smaller changes in

hemodynamic parameters of the hemispheres and vertebrobasilar system during postflight tests were seen during the first days of the recovery period. Regional hemodynamic parameters returned to the preflight level within 3 to 14 days postflight. The vascular response to the head-down tilt at -15 and -30 deg was the most informative. This led to the recommendations concerning modifications of antiorthostatic tests to be used in the selection of space crewmembers for short-term flights.

Author

N83-26431# Joint Publications Research Service, Arlington, Va. HUMAN VESTIBULAR REACTIONS TO GALVANIC STIMULATION OF LABYRINTHS

G. I. GORGILADZE, G. I. SAMARIN, and S. N. RUSANOV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 2, Mar. - Apr. 1983 (JPRS-83467) p 65-71 13 May 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 2, Mar. - Apr. 1983 p 48-52
 Avail. NTIS HC A07

The development of illusionary movements and oscillations of the total body mass center in response to labyrinthine stimulation by ascending and descending current was investigated in 37 healthy test subjects. The stimulation of each labyrinth separately or both labyrinths by the current of opposite direction caused illusionary sensations of tilts, turns and tumbles in various planes. When the test subjects were on the stabilographic platform, their total body mass center shifted toward the anode. Simultaneous stimulation of both labyrinths by the current of one direction produced qualitatively new reactions, such as illusionary movement and displacement of the mass center toward the sagittal plane

Author

N83-26432# Joint Publications Research Service, Arlington, Va. HUMAN BLOOD BIOGENIC AMINES AND THEIR PRECURSORS IN ANTIORTHOSTATIC POSITION AND WITH INTAKE OF PHARMACOLOGICAL AGENTS FOR PREVENTION OF SEASICKNESS SYNDROME

N. A. DAVYDOVA, S. L. ILINA, and V. V. SABAYEV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 2, Mar. - Apr. 1983 (JPRS-83467) p 72-77 13 May 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 2, Mar. - Apr. 1983 p 53-56
 Avail. NTIS HC A07

The 6-hour exposure to head-down tilt at -15 deg was accompanied by an increased blood content of adrenaline and noradrenaline, thus indicating the activation of the sympathoadrenal system. The catecholamine concentration was shown to be proportional to the head-down tilt time. The exposure also led to an increase of the content of serotonin and left the content of 5-hydroxytryptophan, tryptophan, histamine and histidine unchanged. After administration of ephedrine and especially, ephedrine in combination with pipolphen the increase in the concentration of catecholamines and serotonin became significantly less pronounced.

Author

N83-26439# Joint Publications Research Service, Arlington, Va. EFFECT OF PHYTONCIDES ON CEREBRAL CIRCULATION IN FLIGHT CONTROLLERS DURING PROFESSIONAL WORK

Y. S. LESHCHINSKAYA, N. M. MAKARCHUK, A. F. LEBEDA, V. V. KRIVENKO, A. K. SGBINEV, and T. S. BAGATSKAYA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 17, No. 2, Mar. - Apr. 1983 (JPRS-83467) p 115-120 13 May 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 2, Mar. - Apr. 1983 p 80-83
 Avail. NTIS HC A07

In order to optimize the environment in which flight controllers normally work, volatile phytoncides of brandy mint, lavender, and anise were used. After their 20-day application the health condition of the flight controllers improved. By the end of the working hours they felt less tired. Besides, as shown by the rheoencephalographic data, their cerebral circulation showed no abnormalities. The examinations carried out at the end of the first shift and at a high occupational load, when no phytoncides were used, showed that the REG-wave amplitude decreased and tonic tension of cerebral

vessels (alpha, alpha/T, alpha/beta) increased; these changes are typical of fatigue. When the biologically active substances were employed, the changes were of the opposite pattern: adequately increased mental capacity, reactions which included a diminished tension of the vascular wall and a moderately increased blood content of the vessels. Author

N83-26446# Joint Publications Research Service, Arlington, Va.
ELECTRICAL ACTIVITY OF THE SYMPATHETIC NERVOUS SYSTEM RECORDED ON SKIN SURFACE

V. I. SKOK, L. V. MELNICHENKO, I. N. REMIZOV, S. L. PURNYN, and V. V. GERZANICH. In *its USSR Rept Life Sci Biomed. and Behavioral Sci.*, No. 34 (JPRS-83514) p 58-60. 20 May 1983 refs. Transl into ENGLISH from Dokl Akad. Nauk Ukrainy SSR. Ser B (Kiev), no 12, Dec 1982 p 69-71. Avail: NTIS HC A07

The method is created for recording the natural electrical activity of human and animal sympathetic nerve fibers by skin-surface-electrodes. The activity was recorded, stored and averaged as synchronous with cardiac rhythm. The r wave of ecg was used to synchronize the averaging system. It is suggested that the record obtained is the averaged sum of the action potentials that spread in sympathetic fibers innervating the skeletal muscle vasoconstrictors. B.W.

N83-26447* National Aeronautics and Space Administration, Washington, D. C.

AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 245)

May 1983 103 p
(NASA-SP-7011(245), NAS 1 21:7011) Avail: NTIS HC \$7.00
CSCL 06E

This bibliography lists 363 reports, articles and other documents introduced into the NASA scientific and technical information system in April 1983. Author

N83-26448*# National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

EFFECT OF HYDRATION ON NITROGEN WASHOUT IN HUMAN SUBJECTS

J. WALIGORA, D. J. HERRIGAN, JR., and J. CONKIN (Technology, Inc., Houston, Tex.) May 1983 23 p refs
(NASA-TM-58254; S-525; NAS 1 15:58254) Avail: NTIS HC A02/MF A01 CSCL 06P

Five subjects were tested to assess the influence of drinking hypotonic water (distilled water) on whole body tissue nitrogen washout. During the test, the subjects breathed aviators' oxygen for three hours. Each subject performed two baseline nitrogen washouts in a two-week period. The third washout, in the third week, was done under a transient hydrated condition. This was accomplished by having the subjects drink 1.5 liters of hypotonic water 30 minutes before the washout. Five-minute plots of tissue nitrogen removal from the three separate washouts were analyzed to ascertain if the hydration technique had any effect. Our results clearly indicate that the hydration technique did not alter the tissue nitrogen washout characteristics to any degree over three hours. An increase in tissue nitrogen washout under a transient hydrated condition using hypotonic fluid was not demonstrated to be the mechanism responsible for the reported benefit of this technique in preventing Type I altitude decompression pain in man. Author

N83-26449# Naval Research Lab., Washington, D. C.
NEW MEASUREMENT TECHNIQUES USING TRACERS WITHIN LASER-PRODUCED PLASMAS

M. J. HERBST, P. G. BURKHALTER, D. DUSTON, M. EMERY, and J. GARDNER. 6 Jan. 1983 35 p refs
(Contract DNA PROJ I25-BMXI)
(AD-A124640; NRL-MR-5003) Avail: NTIS HC A03/MF A01 CSCL 20I

The use of locally embedded tracers within laser-irradiated solid targets has led to a new class of diagnostic methods for laser-produced plasmas. Demonstrated uses of tracers include the first visualizations of hydrodynamic flow of laser-ablated materials

and improved spectroscopic measurements of plasma density and temperature profiles, comparisons with a two dimensional hydrodynamics computer code are shown. Proposed future uses of tracers include the first measurements of fluid velocity profiles and improved determinations of mass ablation rates.

Author (GRA)

N83-26450# Federal Aviation Administration, Washington, D. C.
Office of Aviation Medicine.

CARBON MONOXIDE IN-FLIGHT INCAPACITATION: AN OCCASIONAL TOXIC PROBLEM IN AVIATION

D. J. LACEFIELD, P. A. ROBERTS, and P. M. GRAPE. Oct 1982 10 p refs
(AD-A123849, FAA-AM-82-15) Avail: NTIS HC A02/MF A01 CSCL 06T

Results from the toxicological study of samples from 4,072 pilots killed in general aviation accidents have revealed that carbon monoxide has been the cause of incapacitation in 21 (0.5 percent) of the cases. Two cases are presented that are typical of accidents caused by incapacitation from carbon monoxide, in that no cause was determined until after toxicological examination of the victims was made. Since no suitable system is available to warn pilots of elevated carbon monoxide levels in the cabin, education of pilots should be undertaken to make them aware of the hazards of exposure to and symptoms produced by this highly toxic gas.

Author (GRA)

N83-26451# JRB Associates, McLean, Va.
POTENTIAL HUMAN STUDY POPULATIONS FOR NON-IONIZING (RADIO FREQUENCY) RADIATION HEALTH EFFECTS

L. C. NOVOTNEY and I. GRAVITIS. Dec 1982 150 p refs
(Contract EPA-68-02-3470)
(PB83-147447, EPA-600 1-82-017) Avail: NTIS HC A07/MF A01 CSCL 06R

This research project was initiated to identify potential human populations for future epidemiological studies of the health effects of radio frequency radiation. Through a literature search and contacts with various groups and organizations, numerous occupations and applications of radio frequency radiation (RFR) were identified and evaluated for their suitability for further study. Many populations were eliminated early because their potential exposure to RFR was too limited or data necessary for epidemiological research were unavailable. Eight populations were evaluated in detail and appear to satisfy many of the criteria for epidemiological research and could be useful study groups in an investigation of the health effects of non-ionizing radiation.

Author (GRA)

N83-26452# Michigan Univ., Ann Arbor. Transportation Research Inst.

SUPERIOR-INFERIOR HEAD IMPACT TOLERANCE LEVELS Final Report

N. M. ALEM, G. S. NUSHOLTZ, and J. W. MELVIN. Nov 1982 279 p refs
(Contract PHS-NIOSH-210-79-0028)
(PB83-144501, UMTRI-82-42) Avail: NTIS HC A13/MF A01 CSCL 06P

Experimental kinematic response and injury data resulting from axial (superior-inferior) head impacts were generated, and then used to establish a head/neck tolerance level used in the design and testing of protective industrial helmets. Fourteen impact tests were conducted on cadaveric specimens. Parameters of impact were the impactor weight (10 kg), its velocity at impact (7 to 11 m/s), padding of the impactor (0- to 5-cm ensolite), and the neck alignment with the spinal column. Peaks of the impact force ranged from 3 to 17 kN. Measured responses were the head 3-D motion and the spinal column accelerations. GRA

N83-27573# Joint Publications Research Service, Arlington, Va.
EFFECT OF DECIMETER WAVES ON FUNCTIONAL STATE OF CARDIOVASCULAR SYSTEM, SOME BIOCHEMICAL AND IMMUNOLOGICAL PARAMETERS OF PATIENTS RECOVERING FROM MYOCARDIAL INFARCTION

Y. I. SOROKINA, N. B. POSHKUS, Y. Y. TUPITSINA, L. P. VOLKOVA, A. V. SHUBINA, and V. Y. KRASNIKOV *In its USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No 9 (JPRS-83601) p 1-5 3 Jun. 1983 refs Transl. into ENGLISH from Vopr. Kurortol. Fizioter. Lech. Fiz. Kult. (Moscow), no. 2, Mar.-Apr. 1982 p 9-13*
 Avail: NTIS HC A03

Optimum localization of decimeter wave (DMW) treatment and its intensity was determined to investigate the effect of DMW on functional state of the cardiovascular system, and clinical biochemical parameters of patients with myocardial infarction in the early posthospitalization period. It is assumed that the effect of DMW via the segmented autonomic system leads to marked changes in the systems. With delivery of treatment to the DI-DV region, the effect on the heart occurs first through the autonomic nervous system which is shown by its vagotropic effect. E.A.K.

N83-27574# Joint Publications Research Service, Arlington, Va.
MORPHOLOGICAL EFFECTS OF CHRONIC ACTION OF SHF FIELD ON NERVOUS SYSTEM OF MICE

V. V. ANTIPOV, V. I. DROBYSHEV, V. S. TIKHONCHUK, V. P. FEDOROV, and L. V. PAKHUNOVA *In its USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No 9 (JPRS-83601) p 14-20 3 Jun. 1983 refs Transl. into ENGLISH from Med. Radiol. (Moscow), no. 7, Jul. 1982 p 58-62*
 Avail: NTIS HC A03

Changes in the nervous system after exposure to electromagnetic radiation in the microwave range were investigated. Significant morphological changes upon exposure to intensive microwave effects are noted. The biological effects of low intensity SHF electromagnetic radiation were minor changes in the system. The possible changes in the organism when exposed to thermal levels are studied with regard to the increasing interest of clinicians in the use of SHF electromagnetic radiation for therapeutic purposes. Questions of the specific nature of the changes and effects of cumulation of damage are studied. The morphological reaction of the central nervous system is compared to the peripheral nervous system. E.A.K.

N83-27575# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF ADAPTIVE PROCESSES IN PERIPHERAL BLOOD USING MATHEMATICAL MODELING METHODS

M. Y. ANTONONOV and N. M. GONCHAR *In its USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No 9 (JPRS-83601) p 21-28 3 Jun. 1983 refs Transl. into ENGLISH from Radiobiol. (Moscow), v. 22, no. 6, Nov-Dec. 1981 p 805-809*
 Avail: NTIS HC A03

The results of a cytochemical investigation of peripheral blood neutrophils upon exposure to microwaves of 2,375 MHz frequency with an energy flux density of 500 micro V/sq cm were analyzed of the presence of two components in the response of the system. a cumulative and a adaptive component were established. A cumulation curve was constructed and the form of the adaptive component determined from experimental data. It is shown that changes in the cytochemical parameters of cells can be used to evaluate the biological action of microwaves of low intensity in the radio frequency band. E.A.K.

N83-27576# Joint Publications Research Service, Arlington, Va.
FUNCTION OF ADRENO-PITUITARY SYSTEM IN VARIOUS REGIMES OF EFFECT OF ALTERNATING MAGNETIC FIELD OF INDUSTRIAL FREQUENCY

N. A. UDINTSEV and V. V. MOROZ *In its USSR Rept. Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 9 (JPRS-83601) p 29-35 3 Jun. 1983 refs Transl. into ENGLISH from Gig. Tr. Prof. Zabol. (Moscow), no. 12, Dec. 1982 p 54-56*
 Avail: NTIS HC A03

Magnetic fields which are widely utilized in industry and in the national economy and their effects were examined. Under production conditions workers are subjected to the effect of highly significant constant and alternating magnetic fields producing functional shifts in the neuroendocrine, cardiovascular and other systems. The standards for the maximum permissible level of effect of magnetic fields during work with magnetic devices and materials were established. The nature of the reaction to the effect of an alternating magnetic field depending on the duration and frequency of the field's effect were evaluated. The dynamics of the function of the basic links of the adrenopituitary system, which plays an important role in the mechanism of adaptation and is sensitive to the effect of a magnetic field were studied. Alternating magnetic fields of an induction of 20 mT of an industrial frequency possessing a significant biological activity for man are examined. E.A.K.

N83-27577* National Aeronautics and Space Administration.
 Lyndon B. Johnson Space Center, Houston, Tex.

BIO-MEDICAL FLOW SENSOR Patent

H. E. WINKLER, inventor (to NASA) 16 Apr. 1981 6 p Filed 16 Apr. 1981 Supersedes N81-24717 (19 - 15, p 2101)
 (NASA-CASE-MSC-18761-1; US-PATENT-4,384,578;
 US-PATENT-APPL-SN-254688; US-PATENT-CLASS-604-114;
 US-PATENT-CLASS-73-204; US-PATENT-CLASS-128-DIG.13;
 US-PATENT-CLASS-604-151) Avail: US Patent and Trademark Office CSCL 06B

A bio-medical flow sensor including a packageable unit of a bottle, tubing and hypodermic needle which can be pre-sterilized and is disposable. The tubing has spaced apart tubular metal segments. The temperature of the metal segments and fluid flow therein is sensed by thermistors and at a downstream location heat is input by a resistor to the metal segment by a control electronics. The fluids flow and the electrical power required for the resisto to maintain a constant temperature differential between the tubular metal segments is a measurable function of fluid flow through the tubing. The differential temperature measurement is made in a control electronics and also can be used to control a flow control valve or pump on the tubing to maintain a constant flow in the tubing and to shut off the tubing when air is present in the tubing.

Official Gazette of the US Patent and Trademark Office

N83-27578* National Aeronautics and Space Administration.
 Lyndon B. Johnson Space Center, Houston, Tex.

APPARATUS FOR DETERMINING CHANGES IN LIMB VOLUME Patent

P. K. BHAGAT (Kentucky Univ., Lexington) and V. C. WU, inventors (to NASA) (Kentucky Univ., Lexington) 10 Feb. 1981 7 p Filed 10 Feb. 1981 Supersedes N81-24716 (19 - 15, p 2101)
 Sponsored by NASA
 (NASA-CASE-MSC-18759-1; US-PATENT-4,383,533;
 US-PATENT-APPL-SN-233270; US-PATENT-CLASS-128-660;
 US-PATENT-CLASS-128-663; US-PATENT-CLASS-73-597)
 Avail: US Patent and Trademark Office CSCL 06P

Measuring apparatus for determining changes in the volume of limbs or other body extremities by determining the cross-sectional area of such limbs many comprise a transmitter including first and second transducers for positioning on the surface of the limb at a predetermined distance there between, and a receiver including a receiver crystal for positioning on the surface of the limb. The distance between the receiver crystal and the first and second transducers are represented by respective first and second chords of the cross-section of the limb and the predetermined distance

between the first and second transducers is represented by a third chord of the limb cross section.

Official Gazette of the US Patent and Trademark Office

N83-27579* National Aeronautics and Space Administration, Washington, D. C.

AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 246)

Jun. 1983 70 p refs

(NASA-SP-7011(246); NAS 1.21 7011(246)) Avail: NTIS HC

\$7 00 CSCL 06E

This bibliography lists 219 reports, articles and other documents introduced into the NASA scientific and technical information system in May 1983. Author

N83-27580# Army Research Inst of Environmental Medicine, Natick, Mass

EFFECTS OF SLEEP DEPRIVATION ON THERMOREGULATION DURING EXERCISE

M. N. SAWKA, R. R. GONZALEZ, and K. B. PANDOLF 1982

24 p refs Sponsored in part by the American College of Sports Medicine

(Contract NIH-OH-00836)

(AD-A124982, USARIEM-M-6/83) Avail: NTIS HC A02/MF A01 CSCL 06S

Five fit males completed a practice, control (C) and sleep deprivation (SD) exercise test. Two nights of normal sleep preceded the C test and 33 h of wakefulness preceded the SD test. These tests consisted of 20 min of rest followed by 40 min of cycle ergometer exercise (50% of peak VO₂) in a temperate (T_{sub} a = 28 C, rh=30%) environment. Esophageal temperature (T_{sub} es), local sweating rate (ds) and chest skin conductance (K_{sub} ch) were continuously measured. In comparison to control levels, sleep deprivation resulted in a 26% increase in T_{sub} es from rest to final exercise values. Total body sweat rate, calculated from Potter balance measurements, was 27% less (P<0.01) for the SD test than the C test. Both d_{sub} s and K_{sub} ch values were lower (P<0.05) during the final 20 min of exercise for the SD than C test. An asynchronous rather than a normal synchronous ds pattern was frequently observed during the SD test. The ds threshold was not changed but the ds sensitivity was 38% lower (P<0.01) during the SD than C test. During the SD test, the K_{sub} ch threshold was 0.11 C lower (P<0.05) and K_{sub} ch sensitivity (delta K_{sub} ch/delta T_{sub} es) was 42% lower (P<0.05) than during the C test. These data indicate that sleep deprivation decreases the potential for evaporative and dry heat loss during moderate intensity exercise. We believe that the reduced and dry heat loss during moderate intensity exercise. We believe that the reduced d_{sub} s and K_{sub} ch responses were mediated by the central nervous system. GRA

N83-27581# Army Research Inst of Environmental Medicine, Natick, Mass.

SLEEP DEPRIVATION DEPRESSES THERMOREGULATORY RESPONSES TO PHYSICAL EXERCISE

M. N. SAWKA and R. R. GONZALEZ (Yale Univ School of Medicine) 13 Dec. 1982 12 p refs

(Contract DA PROJ. 3E1-62777-A-878)

(AD-A125062, USARIEM-M-3/83) Avail: NTIS HC A02/MF A01 CSCL 06S

Thermoregulatory responses were examined in five male subjects during cycle ergometer exercise (50% of maximal aerobic power) in a temperate (T_a=28 C, rh=30%) environment. These exercise tests were conducted following normal sleep (control) and after 33 h of wakefulness. In comparison to control levels, sleep deprivation resulted in a greater increase (26%) in esophageal temperature from rest to final exercise values, sleep deprivation also resulted in reduced total body (27%) and local (19%) sweating rates as well as lowered sweating rate sensitivity (38%). An asynchronous rather than synchronous sweating rate pattern was frequently observed during the sleep deprivation test. Following sleep deprivation the threshold (0.11 C) and sensitivity (42%) for chest heat conductance were decreased. We conclude

that sleep deprivation depressed thermoregulatory responses to physical exercise and that these responses may be mediated by the central nervous system. Author (GRA)

N83-27582# Queen Elizabeth Coll., London (England) Dept. of Physics.

A REVIEW OF THE CURRENT STATE OF EUROPEAN RESEARCH AND KNOWLEDGE CONCERNING THE BIOLOGICAL EFFECTS OF RADIOWAVES AND MICROWAVES Final Scientific Report, Jan. 1981 - Sep. 1982

R. J. SHEPPARD, E. H. GRANT, and F. HARLEN (National Radiological Protection Board) 15 Sep. 1982 107 p refs

(Contract AF-AFOSR-0065-81, AF PROJ. 2301; AF PROJ. 2312)

(AD-A125205, EOARD-TR-83-3) Avail: NTIS HC A06/MF A01

CSCL 06R

This report details work being carried out in various European laboratories concerning the possible biological effects of radiowaves and microwaves. It also details the safety limits for exposure to RF and microwaves in various European countries.

Author (GRA)

N83-27583# Kentucky Univ., Lexington Research Lab.

RESPONSE OF THE CARDIOVASCULAR SYSTEM TO VIBRATION AND COMBINED STRESSES Final Report, 1 Oct. 1979 - 30 Sep. 1982

C. F. KNAPP, J. M. EVANS, and D. C. RANDALL 30 Nov. 1982 81 p refs

(Contract AF-AFOSR-0039-80; AF PROJ. 2312)

(AD-A125225; AFOSR-83-0003TR) Avail: NTIS HC A05/MF A01 CSCL 06S

During the three year grant period, efforts were focused on the relative contribution of cardiac (in addition to peripheral vascular) mechanisms to the frequency response characteristics of integrated cardiovascular regulation during time-dependent acceleration stress. To this end, our chronically instrumented animal preparation was enhanced to include cardiac denervation. In these animals, ultrasonic dimension crystals were also added for measuring left ventricular major and minor axis, wall thickness and calculated volume. This is in addition to instrumentation for measuring aortic flow, left and right ventricular and aortic arch pressures, cardiac output, peripheral resistance, stroke volume, max dp/dt and heart rate. The animal preparation was further refined to include A/V nodal ablation to permit manipulation of heart rate (30 to 300 b/min) via a microprocessor controlled, opened or closed loop system. Closed loop control can be achieved between heart rate and a measured variable or combinations of variables such as arterial pressure, acceleration, etc. A separate study was also conducted to investigate the differences between cardiovascular responses to + and Gy acceleration vectors as well as combinations of Gy and Gz loadings. This study was initiated because of a lack of information concerning cardiovascular responses to Gy loadings and various G blends anticipated from the ACM's of AFTI type aircraft. A summary of major results is presented. GRA

N83-27584# Army Research Inst of Environmental Medicine, Natick, Mass.

RECOVERY FROM SHORT TERM INTENSE EXERCISE: ITS RELATION TO CAPILLARY SUPPLY AND LACTATE RELEASE

P. A. TESCH (Karolinska Hospital) and J. E. WRIGHT 1982 26 p refs

(AD-A124965) Avail: NTIS HC A03/MF A01 CSCL 06S

Muscle force recovery from short term intense exercise was examined in 16 physically active men. They performed 50 consecutive maximal voluntary knee extensions. Following a 40 s rest period 5 additional maximal contractions were executed. The decrease in torque during the 50 contractions and the peak torque during the 5 contractions relative to initial torque were used as indices for fatigue and recovery, respectively. Venous blood samples were collected repeatedly up to 8 min past exercise for subsequent lactate analyses. Muscle biopsies were obtained from m vastus lateralis and analysed for fiber type composition, fiber are and capillary density. Peak torque decreased 67 (range

47-82)% as a result of the repeated contractions. Lactate concentration after the 50 contractions was 2.9 ± 1.3 m/mol and the peak post exercise value averaged 8.7 ± 2.1 m/mol. Based on the present findings it is suggested that lactate elimination from the exercising muscle is dependent upon the capillary supply and influences the rate of muscle force recovery GRA

N83-27585# Army Research Inst. of Environmental Medicine, Natick, Mass. Exercise Physiology Div
ANGULAR SPECIFICITY AND TEST MODE SPECIFICITY OF ISOMETRIC AND ISOKINETIC STRENGTH TRAINING

J. J. KNAPIK, R. H. MAWDSLEY (Northern Illinois Univ.), and M. U. RAMOS (Boston Univ Hospital) 1983 29 p refs Submitted for publication

(AD-A124976; M5/83) Avail: NTIS HC A03/MF A01 CSCL 05I

Six males and six females ($X = 22.6$ years) were assigned to groups which trained either isometrically (90 deg) or isokinetically (30 deg/sec). They trained their left elbow extensors at 80 percent of their maximum voluntary contraction on a modified Cybex apparatus for 10 weeks, three sessions per week, with 50 contractions per session. Before and after training, both groups were tested isometrically (70 deg, 90 deg, 110 deg) and isokinetically (30 deg/sec). When tested isometrically, both groups improved equally, and strength was increased at all three test angles to about the same extent. When tested isokinetically, both groups improved, but the isokinetic group improved to a greater extent. In conclusion, no angular specificity of training was demonstrated within 20 deg of the training angle, and no test mode specificity was seen for isometric testing. However, isometric training showed less transfer to an isokinetic test. Author (GRA)

N83-27586# Army Research Inst. of Environmental Medicine, Natick, Mass.

A LINEARIZED, TIME DEPENDENT MODEL OF THE HEAT TRANSFER AND THERMOREGULATORY RESPONSES OCCURRING UPON IMMERSION IN COLD WATER

L. STRONG and R. F. GOLDMAN Mar 1982 63 p refs (Contract DA PROJ. 3E1-62777-A-878)

(AD-A124972; USARIEM-T-7/82) Avail: NTIS HC A04/MF A01 CSCL 06S

Twenty males subjects (17 to 28 yrs of age) exhibiting a range of body weights (60 less than or = BW less than or = 95 Kg) and body fat (7% less than or = BF less than or = 23%) underwent total immersion while at rest in water between 36 C and 20 C. Their metabolic heat production, which were measured as functions of time and water temperature, were converted to explicit linear functions of core ($T_{sub\ re}$) and skin ($T_{sub\ s}$) temperatures for each individual immersion. These were used to define planes of thermogenic activity which allowed the comparison of the onset and magnitude of shivering between individuals of any morphological group. These thermogenic planes show too much steeper slope with respect to the $T_{sub\ s}$ axis for small, thin men than for heavy, fat men, while men of average weight and fat composition exhibit an intermediate slope. Small, lean men also appear to exhibit thermogenic planes having steeper slopes with respect to the $T_{sub\ re}$ axis than do average and heavy men. Analysis showed that both metabolic and cardiovascular compensation occurs at higher bath temperatures for small, lean

men than heavy fat men. It also showed that body size is more important than body fat content alone in determining maximal total internal insulation. The analysis showed that clothing can lower core temperature rather than elevate it, particularly for some heavy subjects by increasing internal conductances and lowering heat production. This occurs in the face of a net increase in external insulation. GRA

N83-27587# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

COMPARATIVE ANALYSIS OF POSITIVE AND NEGATIVE LATERAL ACCELERATION ON ISOMETRIC FATIGUE M.S. Thesis

R. A. JOHNSON Dec. 1982 77 p refs (AD-A124752; AFIT/GSO/EE/82D-1) Avail: NTIS HC A05/MF A01 CSCL 06S

The USAF Advanced Fighter Technology Integration F-16 is a six degree of freedom aircraft capable of lateral acceleration as well as conventional modes of flight. The purpose of this investigation was to determine the difference, if any, produced by positive and negative lateral (Gy) acceleration on forearm fatigue. The Dynamic Environment Simulator (DES) at the USAF Aerospace Medical Research Laboratory was used to create a lateral acceleration environment. The DES and surface electromyogram (EMG) techniques were used to measure any differences in isometric strength, endurance, and recovery from fatigue observed in the handgrip muscles of the right forearm under + or - 2 Gy acceleration. Also, quantification of the fatigue produced by + or - 2 Gy acceleration was investigated. The results of this study indicate that isometric performance was degraded under -2 Gy acceleration compared to +2 Gy acceleration. A reasonable explanation for the degradation was radial nerve entrapment during -2 Gy acceleration caused by the restraint system being used. The percentage drop in center frequency of the EMG signal was determined unreliable as a fatigue index under lateral acceleration. GRA

N83-27588# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering

A MODEL FOR HUMAN VISUAL PROCESSING WHICH EXPLAINS PERCEPTIONS OF MOTION-AFTER-EFFECTS M.S. Thesis

R. L. CARTER Dec. 1982 135 p refs (AD-A124842; AFIT/GE/EE/82D-23) Avail: NTIS HC A07/MF A01 CSCL 05J

A theoretical model for human visual information processing was developed which attributes functional roles to the cerebellum, lateral geniculate nucleus, and cerebral cortex. The lateral geniculate nucleus is believed to provide sequential monocular mappings as inputs to the primary visual cortex, which uses this information for binocular integration, detection of motion, and other of its functions. In an experiment with the limits of human binocular fusion, two separate limits were discovered. When dichoptic images are first perceived to represent a single object, the limit for fusion is greater than when no initial reference for a single object association is given. A second experiment measured the stimulus duration thresholds for motion-after-effects. Correlation of performance by subjects in the two experiments was used to conclude that similar mechanisms are involved in binocular fusion and the processing of perceptions leading to motion-after-effects. GRA

BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior, crew training and evaluation; and psychiatric research.

A83-33543#**A STUDY OF SELF-INITIATED ELIMINATING FROM THE FLIGHT TRAINING. VI - PERSONALITY TRAITS OF FLYING STUDENTS RELATED TO SELF-INITIATED ELIMINATION.**

M. OKAUE and H. ARUGA (Japan Air Self-Defense Force, Aeromedical Laboratory, Tackikawa, Tokyo, Japan) Japan Air Self Defence Force, Aeromedical Laboratory, Reports (ISSN 0023-2858), vol 23, Dec. 1982, p 181-194. In Japanese, with abstract in English. refs

Personality profile results that showed a tendency to become self-initiated elimines (SIE) among Japanese Air Defense candidates were studied in relation to the record of flight classes with few SIEs and those with a number of SIEs. Multiple correlations were calculated among the different responses and the candidates' responses of whether or not a class had been good or poor, and between pilots and SIEs. 'Read a person's thought' was found to have the highest significance as to the difference of response between the responses of favorable or unfavorable impressions of the course. Between pilots and elimines, however, the word 'important' was reacted to most differently. It is suggested that the actual makeup and atmosphere of the classes area of more importance than using the personality profiles to predict which candidates will successfully complete flight school. M.S.K.

A83-33803**UNDERLYING PSYCHOMETRIC FUNCTION FOR DETECTING GRATINGS AND IDENTIFYING SPATIAL FREQUENCY**

J. P. THOMAS (California, University, Los Angeles, CA) Optical Society of America, Journal (ISSN 0030-3941), vol. 73, June 1983, p. 751-758 refs
(Contract PHS-EY-00360)

Observers detected and/or identified the spatial frequencies of grating stimuli. Spatial frequency varied from 3.8 to 5.5 cycles per degree, and contrast varied from 0.001 to 0.33. In nearly all cases, the psychometric functions that relate performance on the different tasks to contrast are multiples of one underlying function, provided that the functions are expressed in standard normal deviates. The underlying function is positively accelerated at contrasts less than 0.01 and levels off at contrasts greater than 0.05. A vector model interprets the results and relates them to the responses of individual spatially tuned mechanisms. Author

A83-34075**COMPATIBILITY AND RESOURCE COMPETITION BETWEEN MODALITIES OF INPUT, CENTRAL PROCESSING, AND OUTPUT**

C. D. WICKENS, D. L. SANDRY, and M. VIDULICH (Illinois, University, Champaign, IL) Human Factors (ISSN 0018-7208), vol. 25, April 1983, p. 227-248. refs
(Contract N00014-79-C-0658)

Synthesized auditory displays and speech recognizers were used in two experiments to develop guidelines for their implementation in military aircraft. In the first experiment, the competition between encoding and response modalities of concurrent tasks was examined. The memory search task was more susceptible to competition for visual encoding, whereas the tracking task bore the greater impact from shared manual responding. The second experiment examined competition between tasks for encoding and response modalities and the optimum assignment of modalities to a given task. A simulated flight task was performed concurrently with either a spatial task (target acquisition) or a verbal task (memory). Best performance and least interference with the flight task were obtained when the spatial task was displayed visually and responded to manually and also

when the verbal task was displayed auditorily and responded to with speech. Author

A83-34870**SPATIAL FREQUENCY MASKING AND WEBER'S LAW**

D. J. SWIFT (New Hampshire, University, Durham, NH, Michigan, University, Dearborn, MI) and R. A. SMITH (New Hampshire, University, Durham, NH) Vision Research (ISSN 0042-6989), vol 23, no 5, 1983, p 495-505 refs
(Contract NIH-EY-01475; AF-AFOSR-80-0045)

The threshold masking effect of one simultaneously presented grating upon another was studied as a function of mask contrast and frequency. The masking function typically obeys Weber's Law with method-of-adjustment psychophysics, and typically does not with forced-choice. This apparent discrepancy was studied in some detail. It is suggested that thresholds can be set with at least two different criteria, depending upon experimental conditions. When the mask is unfamiliar, it functions as noise and detection occurs at a constant signal/noise ratio, which yields Weber's Law. When the mask is highly familiar, its masking effect is less and obeys a power law. This power-law masking appears to represent an inherent non-linearity of the visual system. Author

A83-34945**FEATURES OF COSMONAUT TRAINING [OSOBENOSTI PODGOTOVKI KOSMONAVTOV]**

G. T. BEREGOVOL, P. R. POPOVICH, and G. M. KOLESNIKOV Khimiya i Zhizn' (ISSN 0023-1142), Dec 1982, p 106-111. In Russian.

The effects of various space flight factors on humans are discussed, and ways in which cosmonauts can be trained to adapt to these factors are examined. Particular emphasis is placed on the effects of weightlessness and on the possibilities of adapting to weightlessness. The possibility of overcoming stress associated with fear is also considered, with particular attention given to the effectiveness of the parachute-jump training technique. B.J.

A83-34974**SOCIOLOGICAL STUDIES FOR THE EVALUATION OF THE RESPONSE REACTION LEVEL OF THE POPULATION TO NOISE [SOTSIOLOGICHESKIE ISSLEDOVANIYA K OTSENKE UROVNIYA OTVETNOI REAKTSII NASELENIYA NA SHUM]**

V. A. TOKAREV (Karagandinskii Meditsinskii Institut, Karaganda, Kazakh SSR) Gigiena i Sanitariya (ISSN 0016-9900), Jan 1983, p. 58-61. In Russian. refs

Results are presented of a sociological investigation of the response reaction level of individuals in cities of various sizes to the perceived level of noise. Approximately 10,000 individuals of various ages, sexes, and socio-economic positions living in five cities in Kazakhstan, USSR, completed detailed questionnaires concerning the effects of noise due to highway traffic, airplane noise, noise from areas surrounding the apartment buildings, etc. Among other results, it was found that the reactions of individuals to the effects of constant noise vary from good-natured reproach and indifference to extremely negative reactions. The level of the response reaction to noise depends on the character of the noise, as well as on the length, frequency, and strength of the individual sources of the noise. N.B.

A83-34980**LOCUS OF CONTROL, SELF-SERVING BIASES, AND ATTITUDES TOWARDS SAFETY IN GENERAL AVIATION PILOTS**

H. WICHMAN and J. BALL (Claremont McKenna College, Claremont, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol 54, June 1983, p 507-510 refs

The results of three surveys are presented which attempted to determine how aviators compared with the general population in the locus of control (external or internal) dimension of personality and how this was related to aviators' attendance at FAA Safety Clinics. Also examined were the aviators' attitudes toward safety, their flying skill, and the likelihood that they would have an accident during the remainder of their careers. It was found that aviators

are significantly more internal in locus of control than the general US population and that they have strong self-serving biases regarding their skill and safety levels. In addition, pilots who attended FAA Safety Clinics were found to have a more internal locus of control than those who did not. N.B.

A83-34984

INTERACTIONS OF ALCOHOL AND CAFFEINE ON HUMAN REACTION TIME

D. J. OBORNE and Y. ROGERS (Swansea, University College, Swansea, Wales) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol 54, June 1983, p. 528-534 refs

The type of interactive effects of alcohol and caffeine on reaction time was investigated using 4 male and 4 female subjects. The reaction time of the subjects was tested under each of four conditions on separate occasions: no alcohol + no caffeine; no alcohol + caffeine; alcohol + no caffeine; and alcohol + caffeine. Alcohol was administered in the form of 65.5 degrees proof vodka in the quantity of 2.2 ml/kg body weight, sufficient to produce a blood alcohol concentration of about 80 mg/100 ml. The caffeine was administered in the form of crushed 150 mg tablets in decaffeinated coffee. Results show that caffeine has a synergistic interaction with alcohol under these conditions. Using Sternberg's (1966) additive-factor method, it was found that the effects of both alcohol and alcohol + caffeine occur mainly at the peripheral stages of information processing (i.e., at the stimulus input and response output) rather than centrally. N.B.

A83-34985

NAVAL AVIATION MISHAPS AND FATIGUE

M. S. BOROWSKY and R. WALL (U.S. Navy, Naval Safety Center, Norfolk, VA) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, June 1983, p. 535-538.

Naval aircraft mishap data were analyzed to determine if statistical relationships among variables generally associated with fatigue and mishap liability exist. Pilots in mishaps were divided into two groups: those who were causally involved and those who were not. The results demonstrated that fighter and helicopter pilots who had worked at least 10 h in the previous 24 were significantly more likely to fall in the causally involved group. Variables related to sleep, continuous duty, missions performed, and hours flown in the immediate past, however, showed no significant relationships with mishap liability. Analysis of mishap rates as a function of time of departure, however, indicated that rates tended to be lowest for flights originating between 0900 and 1800, a result that possibly supports the hypothesis that 'circadian desynchronization' contributes to mishaps. Author

A83-35048

A STIMULATIVE MECHANISM OF HUMAN ADAPTATION TO SITUATIONS OF SENSORY DEPRIVATION [STYMULACYJNY MECHANIZM ADAPTACJI CZLOWIEKA DO SYTUACJI DEPRYWACJI SENSORYCZNEJ]

J. TERELAK (Wojskowy Instytut Medycyny Lotniczej, Warsaw, Poland) and A. RUTA (Centralne Obserwatorium Geofizyczne, Belsk, Poland) Postepy Astronautyki (ISSN 0373-5982), vol. 15, no. 4, 1982, p. 19-28. In Polish refs

A83-35560

A CONTRIBUTION TO THE INVESTIGATION OF TIME-SHARING ABILITY

B. SVERKO, Z. JERNEIC, and A. KULENOVIC (Zagreb, Sveuciliste, Zagreb, Yugoslavia) Ergonomics (ISSN 0014-0139), vol 26, Feb. 1983, p. 151-160. refs

The factor analysis method was employed to study complex task performance in order to determine if a time-sharing ability exists. Six simple and three multiple tasks were employed, i.e., choice responding to lights with the hands, with the feet, and with the hands and feet. The first task consisted of a decision whether or not a signal included a specified symbol, the second (feet) involved stepping on a right or left pedal depending on the appearance of a specified image, and the third, simultaneous task, comprised searching for a set of symbols and subsequent response

with both hands and feet. A total of 51 subjects participated in the trials. Means, standard deviations, and session-to-session performance correlations were calculated based on correct responses. The data confirmed the existence of a time-sharing factor, which could be used by the subjects in proportion to their ability to simultaneously respond to concurrent tasks within brief, arbitrarily defined interval. M.S.K.

A83-35564

OPERATOR'S ACTIVITIES AT CRT TERMINALS - A BEHAVIOURAL APPROACH

N. DELVOLVE and Y. QUEINNEC (Toulouse III, Universite, Toulouse, France) Ergonomics (ISSN 0014-0139), vol 26, April 1983, p. 329-340. refs

A83-35565

A TRIMIX SATURATION DIVE TO 660 M STUDIES OF COGNITIVE PERFORMANCE, MOOD AND SLEEP QUALITY

R. H. LOGIE and A. D. BADDELEY (Medical Research Council, Applied Psychology Unit, Cambridge, England) Ergonomics (ISSN 0014-0139), vol. 26, April 1983, p. 359-374. Research supported by the Royal Naval Personnel Research Committee refs

A83-35597

TOWARD AN UNDERSTANDING OF THE WORK CAPACITY OF THE FLIGHT CREW [K PONIATIIU RABOTOSPOSOBNOSTI LETNOGO SOSTAVA]

N. M. RUDNYI and V. A. BODROV (Voenno-Meditsinski Zhurnal (ISSN 0026-9050), April 1983, p. 49-52. In Russian. refs

A discussion is presented of the definition and meaning of work capacity and various methods of its evaluation which can be used to objectively solve problems concerning the study and prediction of the work capacity of the members of flight crews. It is argued that work capacity is one of the primary social and biological properties of an individual which reflects the possibility to fulfill concrete types of work in defined conditions of activity during a specified period of time and with an indicated effectiveness and quality. The work capacity of flight crews, its level, and its degree of stability can be determined by multifaceted methods of professional, physiological, and psychological factors, including the functional condition of an individual, professional experience, personality, and the conditions and motives of actions. N.B.

A83-35700#

A STUDY OF HUMAN BEHAVIOR IN ADVERSE STRESS

T. O. SARGENT (Sargent Group, Inc., Consultant Services Div., Hartford, CT) American Nuclear Society, Annual Meeting, Bal Harbour, FL, June 10, 1981, Paper. 47 p. refs

A bimodal concept is detailed for modelling individual response to the environment, particularly in stressful conditions. A rigid and a flexible mode of thinking are considered. Large amounts of information are processed by the rigid mode of thought, automatically and in a way that the person is unaware of, while in the flexible mode small amounts of information are processed in an inventive manner. Operators of complex devices require appropriate conditioned responses in order to handle emergencies that arise. The responses are part of the rigid mode, and the flexible mode may not be available for the actions that are needed. Stressful conditions can, however, shift flexible capabilities into the rigid mode, changing behavior without the individual being aware. The shift can cause a lack of differentiation and a high degree of conformity in stressful group situations, and result in a degraded performance of tasks. Maintenance of the flexible capability permits lateral and inventive thinking, with recourse to the conditioned, rigid response. Intellectual and experiential training techniques for developing the seemingly contradictory, but necessary, bimodal functional readiness are outlined. M.S.K.

A83-36208#

A VISUAL CUEING MODEL FOR TERRAIN-FOLLOWING APPLICATIONS

G. L. ZACHARIAS, A. K. CAGLAYAN (Bolt Beranek and Newman, Inc., Cambridge, MA), and J. B. SINACORI (J. B. Sinacori Associates, Hollister, CA) IN: Flight Simulation Technologies Conference, Niagara Falls, NY, June 13-15, 1983, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1983, p. 35-43 refs
(Contract F33615-81-C-0515)
(AIAA PAPER 83-1081)

A model is described to account for the pilot's processing of visual flow-field cues, during low-level flight over uncultured terrain. The model is predicated on the notion that the pilot makes noisy, sampled measurements on the spatially distributed visual flow-field surrounding him, and, on the basis of these measurements, generates estimates of his own linear and angular terrain-relative velocities which optimally satisfy, in a least-squares sense, the visual kinematic flow constraints. A subsidiary but significant output of the model is an 'impact time' map, an observer-centered spatially-sampled scaled replica of the viewed surface. Simulation results are presented to demonstrate the potential for modelling relevant human visual performance data, and for evaluating candidate simulator configurations, in terms of expected impact on the perceptual performance of the terrain-following pilot. Additional model applications are discussed, including interfacing with other human performance models and modelling other types of visually-driven human task performance. Author

A83-36209*# National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

AN INVESTIGATION OF MOTION BASE CUEING AND G-SEAT CUEING ON PILOT PERFORMANCE IN A SIMULATOR

B. T. MCKISSICK, B. R. ASHWORTH, and R. V. PARRISH (NASA, Langley Research Center, Hampton, VA) IN: Flight Simulation Technologies Conference, Niagara Falls, NY, June 13-15, 1983, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1983, p. 44-51. refs
(AIAA PAPER 83-1084)

The effect of G-seat cueing (GSC) and motion-base cueing (MBC) on performance of a pursuit-tracking task is studied using the visual motion simulator (VMS) at Langley Research Center. The G-seat, the six-degree-of-freedom synergistic platform motion system, the visual display, the cockpit hardware, and the F-16 aircraft mathematical model are characterized. Each of 8 active F-15 pilots performed the 2-min-43-sec task 10 times for each experimental mode: no cue, GSC, MBC, and GSC + MBC; the results were analyzed statistically in terms of the RMS values of vertical and lateral tracking error. It is shown that lateral error is significantly reduced by either GSC or MBC, and that the combination of cues produces a further, significant decrease. Vertical error is significantly decreased by GSC with or without MBC, whereas MBC effects vary for different pilots. The pattern of these findings is roughly duplicated in measurements of stick force applied for roll and pitch correction. T.K.

A83-36816

EXPERIMENTAL STUDY OF MENTAL ROTATIONS IN VISUAL REPRESENTATIONS [EKSPERIMENTAL'NOE ISSLEDOVANIE MYSLENNYKH VRASHCHENII V ZRITEL'NYKH PREDSTAVLENIYAKH]

E. V. DEMIDOVA. Psikhologicheskii Zhurnal, vol. 4, Jan.-Feb. 1983, p. 144, 145. In Russian. refs

A83-36818

METHODOLOGICAL PRINCIPLES OF THE INVESTIGATION OF THE INFLUENCE OF THE INTERACTION OF SENSORY SYSTEMS ON PSYCHIC PROCESSES [METODOLOGICHESKIE PRINTSIPY ISSLEDOVANIYA VLIYANIYA VZAIMODEISTVIA SENSORNYYKH SISTEM NA PSIKHICHESKIE PROTSESSY]

F. E. IVANOV and V. F. RUBAKHIN. Psikhologicheskii Zhurnal, vol. 4, Jan.-Feb. 1983, p. 89-98. In Russian. refs

A review is presented of research concerning the interaction of sensory systems, which is connected with investigations of the characteristics of the polymodal perception of objects. It is shown that the central aspect of this problem is the dependence of the organization of information on the structure of intramodal and intermodal interactions. Three main concepts are developed which allow the investigation of the interaction of sensory systems by the systems approach: information-modal congruence, audiovisual integration, and polymodal stimuli convergence. It is determined that an improvement in the rate and precision of the parameters of the cognition process can be obtained in conditions when time-dimension polysensory information is in harmony with the nature of the relations of the interacting sensory systems. N.B.

A83-36819

THE INVESTIGATION OF SOCIAL-PSYCHOLOGICAL FACTORS OF OCCUPATIONAL INJURIES IN GEOLOGICAL-SURVEY WORK [ISSLEDOVANIYE SOTSIAL'NO-PSIKHOLOGICHESKIKH FAKTOROV PROIZVODSTVENNOGO TRAVMATIZMA NA GEOLOGORAZVEDOCHNYKH RABOTAKH]

O. B. GODLINIK. Psikhologicheskii Zhurnal, vol. 4, Jan.-Feb. 1983, p. 135-139. In Russian. refs

A83-36820

THE DETECTION OF A CONNECTION BETWEEN THE EXTENT OF SHORT-TERM MEMORY AND THE ACCURACY OF THE EVALUATIONS OF TIME INTERVALS [VYIAVLENIE SVIAZI MEZHDU OB'EMOM KRATKOVREMENNOI PAMIATI I TOCHNOST'IU OTSENOK VREMENNYKH INTERVALOV]

G. V. KOTKOVA. Psikhologicheskii Zhurnal, vol. 4, Jan.-Feb. 1983, p. 140-144. In Russian. refs

It is shown that a connection exists between the extent of reproduction during direct remembering of visually presented digital symbols and the accuracy of the evaluation of unfilled time intervals. It is proposed that this connection is based on the physiological mechanism of the coding of signals. No positive connection is found to exist between the extent of the reproduction and its variance, which is explained by various contributions of physiological and psychological factors in the formation of these values. Physiological factors include the average frequency of the alpha-rhythm, while the psychological factors include the sum of the actualized images, the stability of attention, motivation, and the characteristics of personality. Physiological factors primarily determine the extent of reproduction, while the psychological factors determine the variance of its value. N.B.

A83-36823

THE PSYCHOLOGICAL BASES OF THE TRAINING OF A HUMAN OPERATOR FOR READINESS TO ACT IN EXTREME CONDITIONS [PSIKHOLOGICHESKIE OSNOVY OBUCHENIYA CHELOVEKA-OPERATORA GOTOVNOСТИ K DEISTVIIAM V EKSTREMAL'NYKH USLOVIYAKH]

G. T. BEREGOVOL and V. A. PONOMARENKO. Voprosy Psikhologii (ISSN 0042-8841), Jan.-Feb. 1983, p. 23-32. In Russian. refs

A theoretical study is presented concerning the training of operators of man-machine systems with the aid of simulator preparation for action in emergency situations. Attention is focused on the psychology and training of pilots and their psychological characteristics during emergency situations. It is determined that prior training in a simulator can help relieve stress in an emergency situation if this training adequately corresponds to the emergency situation. It is concluded that the training of flight crews forms not only psychological defense mechanisms to factors of flight, but

also develops a psychological resistance to the basic factors leading to stress and a lowered work capacity. N.B.

A83-36824

THE EFFECT OF GENOTYPE AND ENVIRONMENT ON EVOKED POTENTIAL PARAMETERS DURING ORIENTING AND DEFENSIVE REACTIONS [VLIANIE GENOTIPA I SREDY NA PARAMETRY VYZVANNYKH POTENTIALOV PRI ORIENTIROVOCHNOI I OBORONITEL'NOI REAKTSIIKH]

B. I. KOCHUBEI *Voprosy Psikhologii* (ISSN 0042-8841), Jan.-Feb. 1983, p. 141-144. In Russian. refs

The individual patterns of evoked potentials during the orienting and defensive reactions, as well as during the process of the habituation of these reactions, were investigated in 22 pairs of monozygotic and 21 pairs of dizygotic twins in order to determine the role of hereditary factors in the origin of these patterns. Results show that the genotype exerts a significant influence on the formation of individual differences in the amplitude of the components O1, P2, and P3 for both the orienting and defensive reactions, and also the P1 component for the defensive reaction. The amplitude of the P2 component is formed almost exclusively under the influence of hereditary factors. The family environment is also found to play an important role in the origin of the variability among individuals of the amplitude of the O1 and especially the P3 components. The variability of the habituation speed of the evoked potential components increases during the transition from the orienting to the defensive reaction. This increase occurs due to the genetically caused variability whose contribution during the habituation of defensive reactions is significantly greater than during the habituation of orienting reactions. N B

N83-26409# Dow Chemical Co., Midland, Mich. Toxicology Research Lab.

TOXICITY, GENDER, AND NEUROBEHAVIORAL RESPONSES

J. L. MATTSSON *In Calif Univ. Proc. of the 12th Conf. on Environ. Toxicol* p 147-154 Apr. 1982 refs

(PAPER-9) Avail: NTIS HC A16/MF A01 CSCL 06C

Beyond those hypothalamic and pituitary specializations that regulate reproduction, the gender-neurobiology literature leads one to the conclusion that although the brains of males and females are far more similar than they are different, there are also many subtle functional, anatomic, and physiologic differences. When neurobehavioral responses to chemicals differ significantly between the sexes, the difference is usually one of vector magnitude rather than vector direction. The following examples illustrate the fact that gender can influence neurobehavioral responses to chemicals, although the mechanisms involved are not necessarily neural. Most of the studies reported are on rats, which are known to have gender-related differences in hepatic metabolism for many chemicals. Author

N83-26445# Joint Publications Research Service, Arlington, Va. **FORECASTING PSYCOLOGICAL AND PHYSICAL PERFORMANCE UNDER STRESSFUL CONDITIONS**

A AYKARALIYEV *In its USSR Rept. Life Sci.: Biomed. and Behavioral Sci.*, No. 34 (JPRS-83514) p 22-25 20 May 1983 Transl. into ENGLISH from Sov. Kirg. (Frunze), 25 Jan. 1983 p 3 Avail: NTIS HC A07

A comprehensive method is developed for forecasting the work capacity of man. It incorporates a determination of a whole series of physiological and biochemical parameters, an evaluation of the individual properties of the central nervous system and personality characteristics. The investigations demonstrated a high degree of correspondence between biochemical and physiological criteria characterizing the resistance of man to oxygen deficit. It was shown that interpersonal relationships in a most direct manner affect the work capacity of a group located for a long period under extreme conditions. B.W

N83-27589# Illinois Univ., Urbana. Electro-Physics Lab.

S-C-R COMPATIBILITY AND DUAL TASK PERFORMANCE IN TWO COMPLEX INFORMATION PROCESSING TASKS: THREAT EVALUATION AND FAULT DIAGNOSIS

C D WICKENS and M. VIDULICH Dec. 1982 47 p refs

(Contract N00014-79-C-0658; NR PROJ. 196-158)

(AD-A124340; EPL-82-3/ONR-82-3) Avail: NTIS HC A03/MF A01 CSCL 05J

This experiment was conducted to extend the principles of stimulus/central-processing/response or S-C-R compatibility, described in an earlier report by Sandry and Wickens, to a more complex environment. The principle states that tasks with verbal central-processing demands will be best served by voice input and output channels. Tasks with spatial demands will be best served by visual/manual channels. A verbal task requiring subjects to proceed through a hierarchical checklist of systems and components to ascertain their status (fault), is time-shared with a spatial task, requiring subjects to evaluate the relative velocity vector of two aircraft for the likelihood of interception. In different conditions each of these were served by both input and output modalities, in single and dual task configurations. The general results indicated that anticipated compatibility effects were obtained and often enhanced under dual task conditions. In particular, in some circumstances compatibility effects dominated those of resource competition. That is, performance on both tasks in a dual task pair was better when they shared a common input channel, but were both S-C compatible, than when they shared different channels, but one was incompatibly displayed. The practical implications of these results to the interfacing of tasks with voice recognition and synthesis technology are discussed

Author (GRA)

N83-27590# Vanderbilt Univ., Nashville, Tenn. Dept. of Psychology.

THE ROLE OF CONVERGENCE IN STEREOSCOPIC DEPTH CONSTANCY

R CORMACK and A. MENENDEZ Jan 1983 34 p refs

(Contract N00014-81-C-0001, NR PROJ. 197-067, RR0420902)

(AD-A124231; N14-0001-83C-0001) Avail: NTIS HC A03/MF A01 CSCL 05J

In order for retinal disparity to be used in making veridical depth judgments, stereoscopic depth constancy must occur. That is, retinal disparity must be rescaled as a function of fixation distance. This is necessary because the retinal disparity associated with a given depth interval varies with the overall distance of the depth interval from the observer. Since accurate depth judgments based on retinal disparity can be made over a wide range, such a rescaling must be made. For both theoretical and practical reasons, it is of importance to know the source of information used by the visual system to recalibrate retinal disparity as fixation distance changes. The present study assessed the importance of convergence in the rescaling of retinal disparity. The results showed no consistent effects of 5 diopters of convergence. These findings show that convergence cannot be the sole source of distance information for rescaling retinal disparity. They suggest that, in the presence of other sources of distance information, convergence plays a minor role in stereoscopic depth constancy. Finally, these data demonstrate the useful-relating to stereoscopic depth perception. GRA

N83-27591# Brandeis Univ., Waltham, Mass

COMPONENTS OF MENTAL IMAGERY REPRESENTATION

S M. KOSSLYN, J. L. BRUNN, K. R. CAVE, and R. W. WALLACH 24 Jan. 1983 120 p refs Prepared in cooperation with Harvard Univ.

(Contract N00014-79-C-0982; NR PROJ 150-442)

(AD-A124616; TR-1) Avail: NTIS HC A06/MF A01 CSCL 05J

The key question asked here was, is mental imagery ability an undifferentiated general skill, or is it composed of a number of distinct subabilities? Further, if imagery is not an undifferentiated general ability, can its structure be understood in terms of the processing components posited by the Kosslyn & Schwartz theory of imagery representation? A set of tasks was administered to a

group of 50 people, and a model was specified for each task. These models invoked different combinations of the processing components posited by the theory. Each subject was assigned a z score on each measure. The z scores from the different tasks were then correlated, revealing a very wide range of coefficients--which suggests that the subjects were not simply good or poor at imagery in general. In addition, the similarity of each pair of processing models was computed by considering the number of common processing components posited by the theory. The correlations among z scores were then compared to the predicted similarities in processing, and were found to be highly related to these measures. This result suggests that the z scores for task performance in part reflected the efficiency of the underlying processing components, and that for a given persons tasks sharing more components tended to be similar in difficulty. Thus, imagery ability is not an undifferentiated general skill, and the underlying components bear a strong correspondence to those posited by the theory. Various additional analyses, considering alternative conceptions and different ways of treating the data, supported these conclusions. Author (GRA)

N83-27592# Pittsburgh Univ., Pa. Learning Research and Development Center
KNOWLEDGE AND SKILL DIFFERENCES IN NOVICES AND EXPERTS Final Technical Report, 1 May 1978 - 31 Jul. 1981
 M. T. H. CHI and R. GLASER 1 Dec 1982 32 p refs
 (Contract N00014-78-C-0375, NR PROJ 157-430)
 (AD-A124466; UPITT/LRDC/ONR/KBC-7) Avail: NTIS HC A03/MF A01 CSDL 05J

The objective of this research is to construct a theory of expertise based upon empirical description of expert problem solving abilities in complex knowledge domains. Our goal is to develop a theory that is representative enough to encompass both analytical types of problem solving (such as, solving problems in physics), as well as more spatial types of problem solving (such as maneuvering in a large-scale environment). Our work in the past three years has proceeded in these two directions. A major interest of the project is to determine the extent to which there are skills that are generalized across domains, and skills that are domain-specific. The practical outcome of our work is the identification of dimensions of expertise that can be taken into account in training and assessing the attainment of high-level competence. GRA

N83-27593# Navy Personnel Research and Development Center, San Diego, Calif.
VALIDATION OF BRAIN EVENT-RELATED POTENTIALS AS INDICATORS OF COGNITIVE STYLES, ABILITIES, AND APTITUDES Interim Report, Oct. 1979 - Oct. 1980
 P. A. FEDERICO, J. N. FRONING, and M. CALDER Feb 1983 43 p refs
 (Contract ZF63522010)
 (AD-A125292; NPRDC-TR-83-11) Avail: NTIS HC A03/MF A01 CSDL 05J

Fifty Navy recruits were given 11 paper-and-pencil tests of cognitive styles, abilities, and aptitudes. Visual, auditory, and bimodal brain event-related potential (ERP) amplitudes were recorded from each of these subjects. Product-moment and canonical correlational analyses, as well as principal-factor analysis and varimax rotation, were conducted. Product-moment correlations indicated that some cognitive attributes were significantly associated with some ERPs. Cognitive characteristics that contributed to the significant canonical correlations were general aptitude, verbal comprehension, spatial ability, field dependence-independence, conceptualizing style, and reflection-impulsivity, as well as ERPs in the right temporal and parietal areas and left frontal and parietal areas. Some ERPs and cognitive characteristics defined the same underlying dimensions, implying that they are related. The results demonstrated the construct validity of ERPs as indicators of individual differences in cognitive characteristics, especially crystallized and fluid intelligence. Author (GRA)

N83-27594# School of Aerospace Medicine, Brooks AFB, Tex. Biomathematics Modeling Branch.

ESTIMATING AIRCREW FATIGUE: A TECHNIQUE WITH APPLICATION TO AIRLIFT OPERATIONS Final Report, Oct. 1980 - Sep. 1981

S. W. SAMN and L. P. PERELLI Dec 1982 29 p refs
 (Contract AF PROJ 7930)
 (AD-A125319, SAM-TR-82-21) Avail: NTIS HC A03/MF A01 CSDL 06S

This report proposes a method of assessing aircrew fatigue based on work/rest profiles. Possible circadian desynchronization and cumulative fatigue an aircrew may have experienced are considered. The method was used to assess aircrew fatigue during computer-simulated airlift operations. It shows quantitatively how flying-hour limitations can affect average aircrew fatigue and system performance. Author (GRA)

N83-27595# ALPHATECH, Inc., Burlington, Mass.
MODELING HUMAN DECISION PROCESSES IN COMMAND AND CONTROL Technical Report, Sep. 1981 - Sep. 1982

J. G. WOHL, E. E. ENTIN, and J. S. ETERNO 14 Feb 1983 72 p refs
 (Contract N00014-81-C-0740, NR PROJ 460-001)
 (AD-A125218; TR-137, TR-1) Avail: NTIS HC A04/MF A01 CSDL 05J

The primary goal of this ongoing project is to model human behavior in specific situations and, in particular, to model high-level decisionmaking for antisubmarine warfare commanders. To abet this modeling effort the SHOR paradigm is presented as a structure for analyzing human cognitive decisionmaking. SHOR describes decisionmaking as a cascading of four activities, they are information processing, hypothesis generation and evaluation, option generation and evaluation, and decision execution. The commander's decisionmaking process is cast into the SHOR framework. A Bayesian (optimal) mathematical model of the decisionmaker's hypothesis evaluation procedure is developed. The inputs to the model are the hypotheses and sensor data, and its outputs are the posterior probabilities of the hypotheses' being true and their respective states of nature. It is assumed that these outputs are sufficient for the commander to perform the option generation and evaluation activities. A brief example of how the posterior probabilities of the hypotheses evolve in the light of new data and implications of the model are presented. Author (GRA)

N83-27596# Stanford Univ., Calif. Dept of Psychology
PSYCHOLOGICAL AND SYSTEM VARIABLES IN TEAM PROBLEM SOLVING: EXPERIMENTAL STUDIES OF COMPUTER-MEDIATED PARTICIPATION

P. G. ZIMBARDO, J. A. W. LINSSENMEIER, P. G. SMITH, and L. G. KABAT (State Univ of New York) Dec. 1982 83 p refs
 (Contract N00014-78-C-0425, NR PROJ 170-866)
 (AD-A124924; Z-82-01) Avail: NTIS HC A05/MF A01 CSDL 05J

A computer-mediated message handling system was developed and refined over the course of three experiments. Turn-taking rules and informational prompts (on-going feedback on rates of participation) were systematically varied during discussions held by four-person experimental teams engaged in problem-solving activities. Variations in shyness (or communication apprehension) and gender composition of the teams were found to influence the process of team problem solving. The extent of individual participation, perceptions of and social-emotional reactions to the group, and the quality of team decisions were modified in some instances by our interventions. We argue for the potential value of studying computer-mediated message systems and for their use as remedial interventions to help balance inequities in participation caused by learned patterns of inhibition, dominance and deference. Suggestions for future research utilizing this system are also presented. Author (GRA)

N83-27597# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

COMPUTER SIMULATION OF A MULTIAXIS AIR-TO-AIR TRACKING TASK USING THE OPTIMAL PILOT CONTROL MODEL M.S. Thesis

W. A. YUCUIS Dec. 1982 120 p refs
(AD-A125302; AFIT-CI-NR-82-62T) Avail: NTIS HC A06/MF A01 CSDL 09B

The primary objective of the research is to simulate the multiaxis air-to-air tracking task and determine if the augmentation control synthesis results in improved piloted vehicle performance. Also, the simulation results will be compared to previously obtained analytical results to see if the optimal pilot control model should be modified. The simulation was accomplished on the Aeronautical Engineering minicomputer simulation system and the results substantiate the claim of improved performance. Since the analytical model and simulation task have different target motions, nothing definitive can be said about modifying the model

GRA

N83-27598# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.

SURVIVAL; MOTIVATION; PREPARATION

U. BERGH, A. GROTH, S. KAELLMAN, and A. BRAEND-PERSSON Feb 1983 22 p In SWEDISH; ENGLISH summary Conf. on Survival Res., Stockholm, 20-21 Oct 1982, sponsored by Research Institute of National Defence (FOA-C-54045-H1) Avail NTIS HC A02/MF A01

Problems of survival, especially for armed forces, and research needs in this area were discussed. Bivouacs, fire, food and water supply, heating problems, treatment of injuries and equipment for primitive conditions arising from emergencies were considered.

Author (ESA)

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MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

A83-33802

SPATIOTEMPORAL VARIATION OF CHROMATIC AND ACHROMATIC CONTRAST THRESHOLDS

D. H. KELLY (SRI International, Menlo Park, CA) Optical Society of America, Journal (ISSN 0030-3941), vol. 73, June 1983, p. 742-750. refs
(Contract NIH-EY-01128)

Moving the retinal image of a sinusoidal grating at a constant velocity (compensated for eye movements) provides controlled spatial and temporal frequencies at every point in the stimulus field. Using this controlled-velocity technique, the detection threshold for isoluminance, red/green gratings has been measured as a function of spatial and temporal frequencies. The chromatic contrast-threshold surface obtained in this way is analogous to the achromatic contrast threshold surface measured previously, but the results are quite different. For very low temporal frequencies, the chromatic sensitivity decreases steadily with decreasing temporal frequency. Below 0.01 Hz, chromatic patterns disappear completely even at maximum contrast (although achromatic of homochromatic patterns do not). In the region above 0.2 Hz, both achromatic and chromatic thresholds can be explained by the same receptive-field-like model. When the center and the surround components of this model are additively combined, they form the chromatic threshold surface, when the sign of either component is reversed, they form the achromatic one

Author

A83-34900

STUDIES OF THE REACTIONS OF HUMAN OPERATORS IN REGARD TO THE TRACKING OF MOVING TARGETS [NIAKOI IZSLEDVANIIA NA REAKTSIITE NA CHOVEKA-OPERATOR PRI PREKHVAT NA DVIZHESHTI SE TSELI]

K. I. TROPOLOV (B'lgarska Akademiia na Naukite, Institut po Tekhnicheska Kibernetika i Robotika, Sofia, Bulgaria) Problemi na Tekhnicheskata Kibernetika i Robotikata (ISSN 0204-9848), vol. 17, 1983, p. 42-47. In Bulgarian.

The paper examines problems associated with the behavior of the operator and the performance of the man-machine system in regard to the tracking of spacecraft immediately after launching. Data are obtained which reflect the relationship between the tracking time and the output state of the plant after the appearance of a conditional image on the pseudo-spatial display. Ways to enhance the reliability of man-machine systems in the tracking mode are examined, and it is noted that the results obtained are intended for the design of man-machine tracking systems

B J.

A83-34947

AN AUTOMATIC SYSTEM FOR THE MEDICAL MONITORING OF THE FUNCTIONAL CONDITION OF A HUMAN [AVTOMATIZIROVANNAIA SISTEMA VRACHEBNOGO KONTROLIA FUNKSIONAL'NOGO SOSTOIANIIA ORGANIZMA]

P. A. ANTONENKO and V. N. LITVINOV (Dnepropetrovskii Khimiko-Tekhnologicheskii Institut, Dnepropetrovsk, Ukrainian SSR) Teoriia i Praktika Fizicheskoi Kul'tury (ISSN 0040-3601), Jan. 1983, p. 42-44. In Russian refs

An automatic system for the medical monitoring of the functional condition of a human subject has been developed. This system provides an objective and relatively accurate determination of the level of the physical development of a subject simultaneously with the determination of the physiological reactions of the subject to physical loading and his adaptive capabilities. Various parameters can be monitored, measured, and recorded using this system, including the functional condition of the cardiovascular system before, during, and after standard work; the functional condition of the vascular tonus and the value of the blood pressure; and the general physical work capacity. Other parameters determined include the aerobic capacity of the subject, the physiological efficiency of oxygen transport, and the degree of the fatigue functions of the central nervous system

N.B.

A83-34979

HEAD AND/OR TORSO COOLING DURING SIMULATED COCKPIT HEAT STRESS

S. A. NUNNELEY and R. J. MALDONADO (USAF, School of Aerospace Medicine, Brooks AFB, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol. 54, June 1983, p. 496-499. refs

The effects of a liquid-cooled vest and/or cap on subjects exposed to a thermal environment which simulated the stress of low-level flight in hot weather were studied. The chamber thermal conditions were set at dry bulb temperature 35 C, wet bulb temperature 26 C, and black globe temperature 43 C. Each of eight male subjects, aged 23-45 yr, were studied in four 100 minute exposures to uncooled control conditions, head cooling only, torso cooling only, and combined head and torso cooling. The cooling effects were evaluated by the changes in the rectal temperature, heart rate, sweat rate, and subjective comfort. Results show that combined head and torso cooling maintained the subjects at nearly their initial (baseline) state. It was found that head cooling was 2-3 times as efficient as torso cooling, although limited by the small surface area involved.

N B.

A83-34982

EVALUATION OF AN EXPERIMENTAL CENTRAL WARNING SYSTEM WITH A SYNTHESIZED VOICE COMPONENT

J. L. WHEALE (RAF, Institute of Aviation Medicine, Farnborough, Hants, England) Aviation, Space, and Environmental Medicine (ISSN 0095-0562), vol 54, June 1983, p. 517-523. Research supported by the Civil Aviation Authority. refs

The use of an experimental central warning system by experienced pilots was evaluated during a realistic flying task. The warning system incorporated audio warnings, voice messages produced by a Votrax synthesizer, and panel legends. It was found that audio warnings produced significantly faster responses than panel legends or voice messages. Voice messages and audio warnings were found to have a greater distracting effect on subjects' responses than panel legends, while workload level did not affect response to either the voice or audio warnings although responses to panel legends did increase significantly at high levels of workload. Some pilots had difficulty understanding the Votrax messages and referred instead to panel legends. These findings indicate that Votrax voice messages may only augment the noise level of the flight deck and could effectively be replaced with an attention-getting sound and panel legend. In addition, it is concluded that crew response to synthetic voice messages which can be understood on first presentation will be more positive than their response to Votrax messages. N.B.

A83-35452

EFFECTS OF DETECTOR COIL SIZE AND CONFIGURATION ON MEASUREMENTS OF THE MAGNETOENCEPHALOGRAM

B. N. CUFFIN and D. COHEN (MIT, Cambridge, MA) Journal of Applied Physics (ISSN 0021-8979), vol 54, June 1983, p. 3589-3594. refs
(Contract NSF PCM-81-19973)

Computer modeling methods are used in determining the effects of coil size and configuration on measurements of a dipolar source in a spherical model of the head. The measurements are made with a magnetometer, which uses a single coil, a first-order, in-line gradiometer, which uses two coils at different distances from the head; and a first-order, side-by-side gradiometer, which uses two side-by-side coils at the same distance from the head. It is found for the magnetometer that the effects of coil size are large enough that the source depth can be overestimated by as much as 0.65 cm and its strength underestimated by as much as 31 percent. For the in-line gradiometer, the effects of the back coil on measurements of sources near the surface of the sphere are small in comparison with the effects of the finite size of the front coil; for deeper sources, the effects are pronounced but are independent of the size of the back coil. For the side-by-side gradiometer, the effects of coil size are sufficiently large that the dipole depth can be overestimated by as much as 0.45 cm and its strength underestimated by as much as 37 percent. C.R.

A83-35559

THERMAL REACTION AND MANUAL PERFORMANCE DURING COLD EXPOSURE WHILE WEARING COLD-PROTECTIVE CLOTHING

M. TANAKA, Y. TOCHIHARA, S. YAMAZAKI, T. OHNAKA, and K. YOSHIDA (Showa University, Tokyo, Japan) Ergonomics (ISSN 0014-0139), vol 26, Feb 1983, p. 141-149. refs

A83-35563

THE SUBJECTIVE EQUIVALENCE OF SINUSOIDAL AND RANDOM WHOLE-BODY VIBRATION IN THE SITTING POSITION - AN EXPERIMENTAL STUDY USING THE 'FLOATING REFERENCE VIBRATION' METHOD

P. DONATI, A. GROSJEAN, P. MISTROT, and L. ROURE (Institut National de Recherche et de Sécurité, Vandoeuvre-les-Nancy, France) Ergonomics (ISSN 0014-0139), vol 26, March 1983, p. 251-273. refs

A83-35566

A CALCULATION AND INTERFERENCE TEST APPARATUS FOR THE SIMULATION OF MENTAL STRESS

F. KLIMMER and J. RUTENFRANZ (Dortmund, Universitaet, Dortmund, West Germany) Ergonomics (ISSN 0014-0139), vol. 26, April 1983, p. 395-400 refs

An apparatus is described which makes it possible to simulate work loads having high mental components and low physical activities. The type, as well as the difficulty, of the work load simulated can be varied. The apparatus comprises a control panel, a punched-tape reader, a central unit, and a display. The control panel allows the experimenter to select the conditions for the task and to monitor them during an experiment. The information on the punched tape is decoded by the punched-tape reader and held in storage for a short time in a memory circuit so that it can be presented in up to six simultaneously displayed digits. The control systems allow the apparatus to be used in two conditions, paced and unpaced. In the paced condition, the stimuli are presented at a fixed rate. The way in which the device can be used in administering calculation tests is described. C.R.

A83-35567

DIGITECH - A MICROCOMPUTER-DIGITIZER FACILITY FOR AUTOMATED TESTING OF MOTOR PERFORMANCE DURING DISCRETE POSITIONING MOVEMENTS

T. O. KVALSETH (Minnesota, University, Minneapolis, MN) and S. W. MOHN (3M Engineering Systems and Technology Laboratory, St. Paul, MN) Ergonomics (ISSN 0014-0139), vol 26, April 1983, p. 401-407. refs

A83-35586

A DESCRIPTION OF AN EXPERIMENTAL PROTOCOL FOR THE STUDY OF THE SEAT COMFORT OF AN AIRCRAFT PILOT [DESCRIPTION D'UN PROTOCOLE EXPERIMENTAL POUR L'ETUDE DU CONFORT DU SIEGE DU PILOTE D'AERONEF]

J. L. POIRIER, R. AUFFRET (Centre d'Essais en Vol, Bretigny-sur-Orge, Essonne, France), R. P. DELAHAYE (Service de Santes des Armees de l'Air, France), P. J. METGES (Hopital d'Instruction des Armees Begin, Saint-Mande, Val-de-Marne, France), B. GESNOT, and C. DELAVIS (Etablissement Central d'Electroradiologie des Armees, Orleans, France) Medecine Aeronautique et Spatiale, vol. 22, 2nd Quarter, 1983, p. 171-175 In French

A method is developed for determining the characteristics of the seat position in an aircraft which provides the maximum comfort for the pilot's spine during flight. The tests are conducted using mannequins and human subjects, and they are designed to consider the angular constraints during ejection in combat aircraft, the manipulation of different controls in helicopters, and the maintenance of a nonfatiguing position during the long hours of flight in transport aircraft. The cabin environments of the different types of aircraft are modelled using an adjustable framework and X-rays are taken of the seated figure to determine the position of the pilot's spine. The X-ray devices are placed in the same geometrical position for each experiment which provides for reproducibility and comparisons between the different values obtained in a series of tests. This method has been employed in tests of the seat position for combat aircraft (ejectable seat), helicopters, and transport aircraft. N.B.

A83-36220#

APPLICATION OF EXPERIMENTALLY DERIVED PILOT PERCEPTUAL ANGULAR RESPONSE TRANSFER FUNCTIONS

R. J. CROSBIE (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) IN Flight Simulation Technologies Conference, Niagara Falls, NY, June 13-15, 1983, Collection of Technical Papers. New York, American Institute of Aeronautics and Astronautics, 1983, p. 146-153. refs
(AIAA PAPER 83-1100)

This paper discusses the experimental derivation of human response transfer functions and their application to the development of a control algorithm for the recently completed NAVAIRDEVCON centrifuge based Dynamic Flight Simulator (DFS).

Centrifuge experiments are described in which human perceived angular response to the individual and combined component angular stimuli of rotating linear acceleration vectors and angular accelerations were measured. Analyses of the data revealed that human response to the combined stimuli could be predicted by adding the predicted response to the individual component stimuli. This knowledge was subsequently used in the development of a control algorithm for the DES in which one component angular stimulus was used to counter-influence the other component angular stimulus. The human response transfer functions were used in this development to compare the predicted angular resonance perceived by the DFS pilot, with the predicted angular response perceived by the simulated aircraft pilot to the same control inputs. This provided a powerful and ingenious method for initially tuning the control algorithm prior to manned operation, by adjusting certain parameters within it to achieve maximum agreement between the two pilots. Author

A83-36475**INHERENT VARIABILITY IN HEAT-STRESS DECISION RULES**

J. D. RAMSEY (Texas Tech University, Lubbock, TX) and C. P. CHAI (U.S. Brass Corp., Abilene, TX) *Ergonomics* (ISSN 0014-0139), vol. 26, May 1983, p. 495-504. refs

There are at present many decision rules that help define hot working environments through the use of heat threshold values, or onset points for increasing the risk of heat strain. A degree of variability is introduced into these decision rules from the inherent need to estimate metabolic work load and measure fluctuating thermal variables. A study is presented here which evaluates the extent of this variability and compares heat-stress decision rules on the basis of comprehensive and abbreviated methodologies. The approach consists in pairing wet-bulb globe temperature (WBGT) values with the corresponding values of heat exchange calculated from the generally accepted equations developed as the heat-stress index (HSI). Several levels of metabolic work load, clothing, radiant heat, wet-bulb temperature, air temperature, and air velocity are used as inputs in a computer model for generating the corresponding HSI and WBGT. This iterative procedure provides the ability to look at the specific work, clothing, and environmental components that yield a limiting heat load of HSI = 75 and then to identify the corresponding WBGT for that set of components.

C.R.

A83-36811**A DEVICE FOR THE BIOMICROSCOPIC STUDY OF THE BLOOD VESSEL BED IN THE EYEBALL CONJUNCTIVA [PRIBOR DLIA BIOMIKROSKOPICHESKOGO ISSLEDOVANIYA SOSUDISTOGO RUSLA KON'IUNKTIVY GLAZNOGO IABLOKA]**

A. V. GAIKIN, A. N. TIKHOMIROV, and N. I. VOLOSOK (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) *Arkhiv Anatomii, Gistologii i Embriologii* (ISSN 0004-1947), vol. 84, Jan 1983, p. 89-94. In Russian. refs

A83-36825**HUMAN THINKING AND THE COMPUTER PROCESSING OF INFORMATION [MYSHLENIE CHELOVEKA I PERERABOTKA INFORMATSII V EVM]**

S. I. SHAPIRO *Voprosy Psikhologii* (ISSN 0042-8841), Jan-Feb. 1983, p. 129-134. In Russian. refs

An investigation is conducted which compares the results and the processes of the solution of the same problem by humans and by a computer. The main differences and the possible points of congruence are determined. It is found that the construction of a solution for a problem by a human includes not only the personal-psychological motivational-demand factors of thought activities, but also lends itself to the programming of logical determinant. The model form of their nondisjunctive coexistence is the logical-psychological coordinates. The dual function of these coordinates in a real psychological process of a search consists of anticipation and the generation of a corresponding prediction of an adequate system of mental action. The solution by a human is an amalgam of analytical operations and spatial images. The excessive opposition of the psychological to the logic-algorithmic

in thinking contradicts the Rubinshtein-Brushlinski principle of the nondisjunctiveness of the psyche. N.B

A83-36981* Jet Propulsion Lab., California Inst. of Tech., Pasadena.

CONTROL OF ROBOT MANIPULATORS FOR HANDLING AND ASSEMBLY IN SPACE

E. HEER and A. K. BEJCZY (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) *Mechanism and Machine Theory* (ISSN 0094-114X), vol. 18, no. 1, 1983, p. 23-35. refs

(Contract NAS7-100)

Long-range NASA planning includes construction and erection of large systems in space requiring automatic handling equipment, teleoperators, or robots under supervisory control. This paper investigates and explores some of the requirements for the control of teleoperated and autonomous space manipulators. The critical technology development areas are identified and discussed in the context of the developments at the Jet Propulsion Laboratory (JPL), and other places. Author

N83-26425# Joint Publications Research Service, Arlington, Va. **DIET FOR HIGH-ALTITUDE MOUNTAIN CLIMBING**

M. S. BELAKOVSKIY, Y. B. GIPPENREYTER, and A. S. USHAKOV. *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 2, Mar - Apr 1983 (JPRS-83467) p. 15-28. 13 May 1983. refs. Transl. into ENGLISH from *Kosmich. Biol. i Aviakosmich. Med.* (Moscow), v. 17, no. 2, Mar - Apr. 1983. p. 14-22.

Avail: NTIS HC A07

The experience accumulated in the Soviet Union and other countries concerning the arrangement of meals for mountaineers ascending the highest summits of the world is discussed. The discussion is made with reference to the reported data on human physiology at high altitudes. Physiological and biochemical investigations carried out at high altitudes and during experimental oxygen insufficiency indicate changes in the nutritional status and function of digestive organs under these conditions. Approaches to the optimization of nutrition of mountaineers at high altitudes are described. Author

N83-26427# Joint Publications Research Service, Arlington, Va. **NUTRITIONAL VALUE OF FOOD IN TUBES FOR PILOTS AND COSMONAUTS**

L. I. KUZNETSOVA, S. Y. GELFAND, I. G. POPOV, L. A. GUROVA, and G. G. AKINSHINA. *In its USSR Rept.: Space Biol. and Aerospace Med.*, Vol. 17, No. 2, Mar - Apr. 1983 (JPRS-83467) p. 39-45. 13 May 1983. refs. Transl. into ENGLISH from *Kosmich. Biol. i Aviakosmich. Med.* (Moscow), v. 17, no. 2, Mar - Apr. 1983. p. 30-35.

Avail: NTIS HC A07

The nutritional value of new canned liquid and puree like foodstuffs in aluminum tubes for aircraft and spacecraft pilots was determined. The recipes and chemical composition of the food items are described. Particular attention is given to the content of amino acids, fatty acids and minerals. It is shown that canned foodstuffs are inhomogeneous in their chemical composition which is to be taken into consideration when they are used as menu items. Author

N83-26438# Joint Publications Research Service, Arlington, Va.
ANALYSIS OF TRACE CONTAMINANTS IN ATMOSPHERE FORMED BY HABITAT ENVIRONMENT OF THE CLOSED MAN-HIGHER PLANTS-LOWER PLANTS-MICROORGANISMS SYSTEM

T V NOLDE, Y. V. PEPELYAYEV, O A. SUKHORUKOV, and Y. Y SHEPELEV *In its* USSR Rept: Space Biol. and Aerospace Med., Vol. 17, No 2, Mar. - Apr 1983 (JPRS-83467) p 109-114 13 May 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v 17, no. 2, Mar. - Apr. 1983 p 76-79

Avail: NTIS HC A07

Trace contaminants in the air of a biological life support system which was continuously complicated were examined. Air samples were taken by cooled traps and analyzed by gas chromatography. Changes in the air of the biological life support system as a function of its structure were compared using Hamming distance and composition similarity measures. Matrices of the measures were obtained and a graph whose structure corresponded to changes in the biological life support system was constructed. During prolonged experiments trace contaminants remained relatively stable and changed when a mineralization component was attached. It is concluded that the composition and variations in the organic components of the atmosphere can be used as an integral indicator of the function of the biological life support system as a whole.

Author

N83-26440# Joint Publications Research Service, Arlington, Va.
EXPERIMENTAL APPROACH TO VALIDATION OF A COMBINED SANITATION METHOD FOR COSMONAUTS

S. N. ZALOGUYEV, A. N. VIKTOROV, V. Y. PROKHOROV, K. R. TOLOVSKAYA, I. A. PARCHINSKAYA, V. P. GORSHKOV, K. V. ZARUBINA, M. M. SHINKAREVA, and T. Y. NORKINA *In its* USSR Rept Space Biol. and Aerospace Med., Vol. 17, No. 2, Mar. - Apr. 1983 (JPRS-83467) p 121-125 13 May 1983 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 17, no. 2, Mar. - Apr. 1983 p 83-86

Avail: NTIS HC A07

Efforts made by various authors to obtain the necessary result with respect to assanation by local application of various antimicrobial agents yielded rather limited and brief effects. The desired result was not achieved in cases where the carriers of pathogenic staphylococci were submitted to specific immunization with staphylococcal toxoid. On the basis of clinical experience and current conceptions of the pathogenesis of St aureus carrier state in health subjects, studies were pursued to explore the possibility of creating the necessary conditions to eliminate pathogenic staphylococci from carriers by means of a combined treatment, which included agents for direct suppression of the existing microbial focus against the background of stimulating the immunity system

L.F.M.

N83-26453 Royal Signals and Radar Establishment, Malvern (England).

PREDICTIVE DISPLAY DESIGN FOR A TWO-AXIS CONTROL TASK

P J. GOILLAU Aug 1982 34 p refs Sponsored Loughborough Univ. of Technology and Warren Spring Lab. (RSRE-MEMO-3532; BR86544) Avail Issuing Activity

A simulation study was carried out using a generalized two-axis control and guidance task to investigate predictive display design parameters. Predictive displays are found to bring about a substantial improvement in man-machine system performance over unaided manual control. Recommendations are made regarding the choice of prediction model and prediction span as a function of controlled system dynamics and input uncertainty. The need to augment human anticipatory skills in complex control tasks is highlighted, and a methodology for optimizing predictive display design which could be extended to aerospace and missile guidance applications is presented.

Author (ESA)

N83-26454# Research Inst. of National Defence, Stockholm (Sweden) Dept 5.

INTERNATIONAL CONFERENCE ON PROTECTIVE CLOTHING SYSTEMS

K. AMUNDIN, ed., C. BRUNIUS, ed., and A. BRAEND-PERSSON, ed. Jan. 1983 421 p refs Proc. held at Stockholm, 23-27 Aug. 1981; sponsored by Defence Materiel Administration, Swedish Textile Industries, Almedahls AB, Boraas Waefveri AB, AB Eiser, Nordiska Fjaeder AB, Rosens Trkaandustrier AB, Trelleborg AB and Gustaf Werner AB

(FOA-C-54043-H1) Avail NTIS HC A18/MF A01

Protective functions of clothing systems, evaluation methods, and design of protective clothing systems were discussed.

N83-26455# Research Inst. of National Defence, Stockholm (Sweden). Dept 2

THE SPACE SUIT: MAN'S MOST SOPHISTICATED PROTECTIVE GARMENT

C. J. CLEMEDSON *In its* Intern. Conf. on Protective Clothing Systems p 17-27 Jan. 1983 refs

Avail: NTIS HC A18/MF A01

The design and development of the space suit used in the Apollo lunar missions are described. Mobility problems are overcome by using constant volume bellows joints. The suit is effective in the temperature range from -273 to 200 C. The portable life support system allows 4hr autonomous operation on the lunar surface. The outer layer of the suit can stop 0.5 g/cc particles traveling at 30 km/sec.

Author (ESA)

N83-26456# National Board of Occupational Safety and Health, Solna (Sweden) Research Unit of Climatic Physiology.

ROLE OF CLOTHING FOR MAN'S HEAT EXCHANGE WITH THE ENVIRONMENT

I. HOLMER *In* Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 31-50 Jan. 1983 refs

Avail: NTIS HC A18/MF A01

Methods of evaluating protection offered by clothing against thermal stress; of comparing the performance of garments; and of measuring the physiological strain associated with work for a given clothing assembly are discussed. Predictive models of thermal strain are presented. Thermal insulation and resistance to evaporative heat transfer are considered. The influence of body motion, wind and wetness on thermal properties is examined

Author (ESA)

N83-26457# Technical Research Centre of Finland, Tampere Textile Lab.

RESEARCH CONCERNING COLD WEATHER CLOTHING

H. MEINANDER and R. PAAAKKOENEN (Oulu Regional Inst. of Occupational Health, Finland) *In* Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 51-57 Jan. 1983 refs

Avail: NTIS HC A18/MF A01

Results of physical measurements of textile materials and combinations, physiological tests in a climatic chamber of clothing systems, and field tests in Lapland during winter are discussed. Tests on an overall for extremely cold environments are summarized. Subjective assessments rate the overall higher than control garments, but measurement results show no significant differences between the tests.

Author (ESA)

N83-26458# Prins Maurits Lab. TNO, Rijswijk (Netherlands).

SKIN PROTECTION AGAINST NUCLEAR HEAT FLASH

J. MEDEMA *In* Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 59-66 Jan. 1983 refs

Avail: NTIS HC A18/MF A01

Six protective garment outerlayers backed by carbon loaded PU foam and normal combat clothing were subjected to 120 and 60 J pulses from a 25 kw xenon bulb in order to simulate the effects of thermal radiation from a 30 kton nuclear explosion. Results show that: flame retardancy of an outerlayer of NBC clothing is a prerequisite for good nuclear heat flash protection; flame retardancy of the foam layer is necessary also when

protection above 60 J/cmsq in 1 sec is wanted; nonmelting, nonshrinking outer fabric behaves best in nuclear heat flash protection; and a built-in reflective layer, either mineral fiber or a white fabric has a positive effect on protection. Author (ESA)

N83-26459# Prins Maurits Lab. TNO, Rijswijk (Netherlands).
SKIN PROTECTION AGAINST CHEMICAL WARFARE AGENTS
M. VANZELM, J. MEDEMA, and P. T. VANRAAIJ /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 67-72 Jan. 1983
Avail. NTIS HC A18/MF A01

Penetration tests for impermeable materials, vapor penetration of permeable materials, and penetration from static or falling drops of the inner and outer layers of garments for protection against chemical weapons are discussed. Experience shows that impermeable materials can be easily tested by the drop method. In the category of rubbers, butyl rubber is the best choice; several plastics can be chosen. Vapor tests give a good impression about the quality of the absorbent layer in permeable protective clothing. Fully reticulated PU foam loaded with carbon shows the highest activity. A tightly woven liquid repellent outlayer or a two layer fabric repellent outside wicking give the best protection.

Author (ESA)

N83-26460# Helly-Hansen A.S., Moss (Norway)
SEMI-IMPERMEABLE PROTECTIVE SUIT NM77
T. S. NISLEN /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems P 73-81 Jan. 1983
Avail. NTIS HC A18/MF A01

A suit which protects the whole body except hands, feet and face is presented. Around 200 l/min of air is exchanged at 40% of maximum activity, allowing 16% of produced sweat to evaporate. While soldiers reach exhaustion within 91 min using an impermeable garment (Nato B-2) at the working load of 38% of the maximum, they can work at 43% of the maximum for 100 min in an NM77 suit without coming near to exhaustion. The suit has a 24 hr penetration time for mustard gas as opposed to 8 hr for B-2 suits. Although the NM77 suit gives poor protection against aerosols, the use of a respirator with the suit ensures adequate protection.

Author (ESA)

N83-26461# Research Inst. of National Defence, Stockholm (Sweden). Dept. 2.
PERMEATION OF ORGANIC SUBSTANCES THROUGH POLYMER MATERIALS USED IN PROTECTIVE CLOTHING
A. LINNARSON /In its Intern. Conf. on Protective Clothing Systems p 83-88 Jan. 1983 refs
Avail. NTIS HC A18/MF A01

The permeability of polymer membranes by pure solvents and by mixtures of solvents was tested. Mass spectrometer readings indicate that rapidly penetrating substances act as pilots for slowly penetrating ones. The behavior of mixtures can be classified in four groups: the lag time for the pilot is unchanged and the lag time for the piloted substance is shortened, the pilot substance has a prolonged lag time and the piloted one has a decreased time; shortened lag times for both pilot and piloted substances; and all systems with unchanged lag times. For membranes punched from nitrile rubber and tested with toluene, the measured penetration curve does not have the normal S-shape. After the initial penetration the concentration of toluene on the back side of the membrane increases rapidly to a maximum and then declines to a steady state.

Author (ESA)

N83-26462# Research Inst. of National Defence, Stockholm (Sweden). Explosives Div.
AN ANTHROPOMETRIC DUMMY FOR BLAST RESEARCH
A. JOENSSON, C. J. CLEMEDSON, and E. ARVEBO /In its Intern. Conf. on Protective Clothing Systems p 89-97 Jan. 1983 refs
Avail. NTIS HC A18/MF A01

A dummy torso which enables lung damage resulting from blasts to be predicted is described. The pressure-time functions of the blast are recorded by a pressure transducer inside a model lung.

This lung can be connected to a head bored with holes to simulate the human respiratory system air ways, or to a head with pressure transducers which measure loads on tympanic membranes. Geometrical and structural similarity of the dummy to a real body, dynamic properties of the torso, indications of the severity of blast exposure, and sensitivity to factors influencing the production of lung injury, and strength of material and repeatability are discussed. Author (ESA)

N83-26463# Army Natick Research and Development Command, Mass. Individual Protection Lab.
THE DEVELOPMENT OF A NEW HELMET FOR THE US ARMY
J. V. E. HANSEN /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 99-108 Jan. 1983 refs
Avail. NTIS HC A18/MF A01

A helmet with troop acceptance/preference 90% was designed after casualty studies revealed significant numbers of head wounds with the old helmet, which was also considered to be uncomfortable to wear for long periods. Helmet design was influenced by hearing and vision requirements and the necessity for the helmet to be compatible with a variety of weapons and equipment, as well as the fragmentation vest to be worn with the helmet. The ballistic effectiveness of various materials in terms of casualty reduction not only from fragment penetration, but in terms of dynamic deflection/blunt trauma injuries was investigated. Additional constraints of neck musculature stress during ballistic impact and permissible heat stress also were taken into account.

Author (ESA)

N83-26464# Institute for Perception RVO-TNO, Soesterberg (Netherlands).
FUNCTIONAL TESTING OF BODY ARMOR
W. A. LOTENS /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 109-117 Jan. 1983 refs
Avail. NTIS HC A18/MF A01

A spall protective vest was chosen from four models and a fragmentation protective vest from five models in a sequence of tests covering ballistic protection, functional obstruction, mobility and user experiences. Test design was optimized with respect to effort by successive reduction of the number of models. Functional obstruction was scored by an ergonomics expert at a large number of military functions. Mobility was tested with 5 different performance tests, following a test design with 12 subjects. Overall loss of performance is 5% for spall protection, 11% for fragmentation protection and 15% for an additional type such as bullet protection.

Author (ESA)

N83-26465# National Board of Occupational Safety and Health, Solna (Sweden). Research Unit of Climatic Physiology
PHYSIOLOGICAL EVALUATION OF EVAPORATIVE HEAT TRANSFER RESISTANCE BY CLOTHING
I. HOLMER and S. ELNAES /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 121-132 Jan. 1983 refs
Avail. NTIS HC A18/MF A01

A technique for the determination of water vapor pressure at the skin surface and its application to the measurements of dry and evaporative heat transfer through clothing are described. The method is based on partitioned calorimetry of the heat exchange of man with the environment. All experiments are performed in a climatic chamber in which air temperature and relative humidity can be controlled to + or - 0.5°C and + or - 2.5%. Mean skin temperature is calculated from the area weighted average from at least eight different sites. Metabolic energy production is calculated from measurements of oxygen uptake. Evaporative heat loss is determined by continuous weighing. Evaporation rate is corrected for metabolic weight loss and the evaporative heat loss is determined. Water vapor pressure is determined in an air sample withdrawn from a system of six plastic tubes each terminating at representative areas of the skin surface. Results for various types of clothing are presented.

Author (ESA)

N83-26466# Kansas State Univ., Manhattan Inst. for Environmental Research.

A SCALING PROCEDURE FOR EVALUATING THE COMFORT CHARACTERISTICS OF PROTECTIVE CLOTHING

F. H. ROHLES, JR., S. A. KONZ, E. A. MCCULLOUGH, and G. A. MILLIKEN /In Research Inst. of National Defence Intern. Conf on Protective Clothing Systems p 133-140 Jan 1983 refs Avail NTIS HC A18/MF A01

A method for evaluating subjective responses to the environment and to given features of an environment is presented. The method combines factor analytic techniques with bipolar adjective semantic differential scales. The scale was used to determine the comfort characteristics of protective clothing at high temperatures. Tests were carried out in an environmental chamber. Physiological measurements were treated by an analysis of variance with temperature, garment and observation as sources of variance. The F ratios are not significant, nor are those for thermal sensation or thermal comfort. For the clothing comfort scale however, results are significant at $p = 0.01$ when 'garment' is the source of variance. Author (ESA)

N83-26467# Forschungsinstitut Hohenstein, Boennigheim (West Germany). Bekleidungsphysiologisches Inst.

EVALUATION OF COMFORT CHARACTERISTICS OF CLOTHING BY USE OF LABORATORY MEASUREMENTS AND PREDICTIVE CALCULATIONS

K. H. UMBACH /In Research Inst. of National Defence Intern. Conf on Protective Clothing Systems p 141-149 Jan. 1983 refs Sponsored by Forschungskuratorium Gesamttextil und Arbeitsgemeinschaft Industrieller Forschungsvereinigungen (AIF) Avail NTIS HC A18/MF A01

A five level system for the physiological evaluation of clothing is outlined. Physical analysis of fabrics on a skin model is followed by biophysical analysis of clothing systems using movable manikins. Physiological data and subjective ratings are obtained in controlled wear tests with subjects in climatic chambers. Controlled, limited, field tests precede full field tests. Results indicate that the laboratory tests predict accurately the wear comfort reported in field tests. Author (ESA)

N83-26468# Centre de Recherches du Service de Sante des Armees, Lyons (France) Div. of Physiologie.

PHYSIOLOGICAL EVALUATION OF THERMAL STRAIN DUE TO PROTECTIVE CLOTHING: APPLICATION TO HELICOPTER PILOTS

R. HENANE, J. BITTEL, and M. GUILLERMIN /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 151-159 Jan. 1983 refs Avail: NTIS HC A18/MF A01

Dry and humid heat exchanges occurring in helicopter pilots wearing protective suits were tested in a climatic chamber and in flight conditions on sunny and warm days. An index of water permeability (lw) was derived: $lw = Ec1/Enu$ where $Ec1$ and Enu are steady state evaporative rate in clothed and nude conditions, $lw=1$ for totally permeable clothing and $lw=0$ for totally impermeable clothing. The absolute evaporation through clothing layers measured by weighing was compared to predicted evaporation. This index, combined with biophysical estimation of CLO and the permeability index Im , is proposed as a means of estimating physiological stress due to the thermal burden of clothing. Author (ESA)

N83-26469# Wuppertal Univ (West Germany) Fachgebiet Arbeitssicherheit/Ergonomie.

STRESS AND STRAIN BY WEARING PROTECTIVE CLOTHING

T. HETTINGER and G. EISSING /In Research. Inst. of National Defence Intern. Conf on Protective Clothing Systems p 161-166 Jan. 1983 refs Sponsored by Bundesanstalt fuer Arbeitsschutz und Unfallforschung Avail: NTIS HC A18/MF A01

Tests carried out in order to: validate methods for predicting stress and strain associated with wearing protective clothing; to study the protection offered against heat radiation; and to assess

the influence of acclimatization on resistance to thermal stress are summarized. Analysis indicates that increase of stress and strain associated with different kinds of clothing can be proved statistically at different levels of significance for various levels of stress on a treadmill. The metabolic rate by work is significant only for the difference between complete protection and the other kinds of clothing, whereas the work pulse rate is significantly different between all kinds of clothing. Author (ESA)

N83-26470# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

HEAT STRESS, HEAT STRAIN AND RISK OF HEAT DISORDER

W. A. LOTENS /In Research Inst of National Defence Intern. Conf. on Protective Clothing Systems p 167-175 Jan 1983 refs

Avail: NTIS HC A18/MF A01

A diagram that summarizes approaches to thermoregulatory modeling is presented. Input for the diagram are environmental conditions, related via clothing, the human body and task execution to task performance. By postulating that performance fully breaks down by heat disorder when heat strain exceeds a critical value, risk of heat disorder can be calculated. Individual risk is hard to predict, but the risk for a large group can be predicted with models, if risk is high. For low risk, residual cooling power (maximum possible cooling minus heat production) is introduced. When this becomes lower than 250 W, risk increases for untrained people (below 100 W for trained people). Author (ESA)

N83-26471# Research Inst of National Defence, Linköping (Sweden) Dept. 5

STRESS AND PERFORMANCE OF MILITARY PILOTS UNDER HEAT LOAD

E. SVENSSON /In its Intern. Conf on Protective Clothing Systems p 177-193 Jan. 1983 refs Avail: NTIS HC A18/MF A01

The effects of thermal stress on perception, decision making, motor behavior, thermal comfort, physical and mental workload, activation and tension level, and motivation were studied. During trials lasting 190 min, subjects accomplished three different psychological tests and answered a questionnaire repeated 5 times at 30 min intervals. Subjects also performed a compensatory tracking task. Subjects wore winter flying gear under conditions of mild, moderate or extreme thermal stress. Results indicate that given sufficient motivation subjects can cope with complex mental tasks in protracted stressful situations. Tracking-task performance is more affected by thermal stress than are memory or reaction times. Author (ESA)

N83-26472# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

RESTRAINT BY CLOTHING UPON FIRE-FIGHTERS PERFORMANCE

E. J. G. VANDELINDE /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 195-204 Jan. 1983 refs Sponsored by Technical and Inspection Dept. of Fire Services

Avail: NTIS HC A18/MF A01

Physiological strain caused by metabolic and environmental heat and fire protective clothing was studied. Six subjects performed light work on a treadmill in two different climates, wearing three different types of clothing. For each of the resulting 36 sessions heat balance was reconstructed and clothing parameters were calculated. Measurements show little difference in insulation but large differences are found in water vapor permeability, ranging from 0.11 to 0.25. Poor permeability results in high heat strain, especially during moderately hot work or recovery periods. Predictions of tolerance time during a moderately hot fire trial are shorter than measured. Differences in tolerance time between clothing are predicted correctly. A diagram that displays safe work time as a function of metabolic and environmental heat load is proposed. Author (ESA)

N83-26473# Kansas State Univ., Manhattan. Inst for Environmental Research.

MEASURING THE THERMAL INSULATION AND PERMEABILITY OF PROTECTIVE CLOTHING USING A COPPER MANIKIN

E. A. MCCULLOUGH, F. H. ROHLES, JR., and S. A. KONZ /in Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 205-214 Jan. 1983 refs (Contract S-R01-OH-00874)

Avail: NTIS HC A18/MF A01

Test methods for measuring and quantifying the resistance to heat transfer of military clothing assemblies were used to study the thermal insulation and evaporative impedance of clothing worn in hot industrial environments. Results indicate that the clothing items which provide the most protection to the wearer from industrial hazards often restrict the amount of body heat loss that is possible through radiation, convection, conduction, and particularly evaporation. Although the copper manikin measurements are useful in ranking work clothing assemblies, they should be supplemented by physiological chamber studies.

Author (ESA)

N83-26474# Kansas State Univ., Manhattan. Inst. for Environmental Research.

THE EFFECTIVENESS OF WATER COOLING UNDER PROTECTIVE CLOTHING AT TEMPERATURES BETWEEN 22 C AND 55 C

S. A. KONZ, F. H. ROHLES, JR., and E. A. MCCULLOUGH /in Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 215-221 Jan. 1983 refs (Contract TV54678A; DE-AC01-79CS-20272)

Avail: NTIS HC A18/MF A01

Non-heat-acclimatized subjects were exposed to heat stress in temperatures ranging from 22 to 55 C in 2 hr sessions (maximum). Subjects sometimes wore respirators and water cooling garments so their effect on heat tolerance could be judged. Subjects worked at a moderate metabolic rate (290 Watts) until they completed 120 min. of work or until they were removed for medical reasons. The best criterion of heat stress tolerance time without auxiliary cooling, and acceptance of the cooling units by the users were studied. The respirator has no effect on tolerance time or clothing comfort. Of the 125 trials where the subject was removed early, only 9 (7%) were due to rise in body temperature. Excessive heart rate (over 160 beats/min) caused removal of 79 (63%) and rise in diastolic blood pressure (over 110 mm Hg) removal of 26 (21%); all others were 9%. Predicted tolerance time without cooling ranges from 300 min at environmental temperatures of 22 C to 15 min at environmental temperature of 43 C. The water cooled garment increases tolerance time by 15 min. At 55 C, tolerance time increases 50%.

Author (ESA)

N83-26475# Swedish Inst. for Textile Research, Gothenburg (Sweden).

A FOOT-AND-LEG SIMULATOR FOR ASSESSING COMFORT PROPERTIES OF CLOTHING

S. E. HAENEL /in Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 223-228 Jan 1983

Avail: NTIS HC A18/MF A01

A foot and leg simulator for assessing thermal and moisture resistance of clothing is described. Electrical heater wires and thermistors are imbedded in the surface. The foot is partitioned into five separately heated sweat gland areas, each with a water inlet. The ankle and knee areas are used as guard zones. The lower leg is divided into three sweat gland areas. Additional thermistors can be placed outside the skin. The foot and the leg are painted twice with heat conducting paint. A form-fitting stocking made from 2 mm thick nonwoven skin is sewn into place. Outside this is another stocking sewn from Goretex. This outer layer is waterproof but has a very low moisture resistance, ensuring that the test specimen is not wetted by the sweat glands. A microcomputer is used for data collection and control of temperatures and water dosing.

Author (ESA)

N83-26476# Linköping Univ. (Sweden) Dept of Biomedical Engineering.

A SYSTEM FOR RECORDING WATER VAPOR PERMEABILITY THROUGH CLOTHING MATERIALS

L. NILSSON and G. E. NILSSON /in Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 229-234 Jan. 1983 refs Sponsored by Swedish Research Inst. of National Defence

Avail: NTIS HC A18/MF A01

An evaporimeter system for measuring clothing material resistance to water vapor is described. An incubator with variable temperature and relative humidity simulates ambient conditions. A cylindrical temperature-regulated water bath is placed inside the chamber. Evaporation from the bath is adjusted by altering the water temperature with a temperature regulator. The bath is placed on a magnetic stirrer assembly. Above the bath there is a modular system of rings for fixing the clothing specimens. Specimens can be placed at different distances from the evaporative water surface. The water vapor permeability of a single layer as well as that of several layers, in contact or separated by an air gap, can be measured. The evaporimeter probe is placed in the climate chamber. Evaporimeter and the temperature regulator signals are recorded on a multichannel ink recorder.

Author (ESA)

N83-26477# Swedish Inst for Textile Research, Gothenburg (Sweden).

LABORATORY EVALUATION OF COMFORT RELEVANT MOISTURE AND HEAT TRANSFER BEHAVIOR OF TEXTILE FABRICS

R. SHIRSHOO /in Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 235-241 Jan. 1983 refs

Avail: NTIS HC A18/MF A01

A method for measuring moisture and heat transfer properties of fabrics at any set of atmospheric conditions in the temperature range from 20 to 40 C at relative humidity up to 95% is presented. Test specimens are preconditioned in a box containing a standard absorbent. This box is placed in the climatic chamber with the test specimen as interface between box and chamber. Moisture transfer is calculated from the weight increase of the absorber. For heat transfer measurements a modified BS 4745: 1971 procedure is used. Preconditioned specimens are placed in LD/HD/LD polyethylene film bags. A 100 Pa pressure is applied and the bags are sealed.

Author (ESA)

N83-26478# National Board of Occupational Safety and Health, Solna (Sweden) Section for Climatic Physiology

THERMAL INSULATION OF HANDWEAR MEASURED WITH AN ELECTRICALLY HEATED HANDMODEL

S. ELNAES and I. HOLMER /in Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 243-250 Jan. 1983 refs

Avail: NTIS HC A18/MF A01

A hand model consisting of a thin plastic outer surface filled with foam and divided into 16 zones is presented. Each zone is covered with kanthal wires in a close pattern. The wires are joined together and to the surface with epoxy glue and painted to simulate black body properties of skin. Thermistors measure the temperature of each zone. Results for measurements on winter mittens are shown.

Author (ESA)

N83-26479# Norwegian Defence Research Establishment, Kjeller.

HEATED CLOTHING SYSTEMS FOR FIELD USE

S. RUSTAD /in Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 251-259 Jan 1983 refs

Avail: NTIS HC A18/MF A01

Portable heaters for local warming of extremities and for the whole body are discussed. A charcoal burning system is introduced. The charcoal system was used for protection from cold of casualties before and during transportation to field hospitals. Thermal equilibrium can be maintained for lightly clothed individuals under Arctic conditions. The system can be used inside garments when

restriction of movement makes sufficient clothing insulation impractical
Author (ESA)

N83-26480# Norwegian Defence Research Establishment, Kjeller.

LIGHT WEIGHT CHARCOAL BURNING HEATER AND HEAT DISTRIBUTION SYSTEM FOR FIELD USE

B. NORDLI, T. A. OFTEDAL, and P. O. SOLBERG /In Research of National Defence Intern. Conf. on Protective Clothing Systems p 261-266 Jan 1983 refs

Avail: NTIS HC A18/MF A01

A charcoal-fuelled casualty heater weighing 600 grams was developed. The charcoal stick is contained in a disposable canister. A miniature battery-powered fan provides combustion air and distributes warm air. The air temperature is controlled by a bimetallic strip. The heat output may be varied in the 50 to 300 W range. A typical heat output is in the order of 150 W for 5 hr on one charcoal element. The warm air is distributed by flexible flat textile tubes or sheets. These can, due to the inside fabric, be squeezed or bent without restricting the warm air flow.
Author (ESA)

N83-26481# Centre Scientifique et Technique de l'Industrie Textile Belge, Gent

EVALUATION OF THERMAL PROTECTION OFFERED BY PROTECTIVE CLOTHING SYSTEMS

L. SMISSAERT /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 267-280 Jan. 1983 refs

Avail: NTIS HC A18/MF A01

Methods for evaluating thermal protection offered by clothing systems in terms of pain threshold and blistering are reviewed. Results are improved if the delay between flame application and transmittance of the energy is taken into account. Skin simulants are useful for visualizing 2nd degree burn injuries, but the backing material to which the skin is fixed can influence results.
Author (ESA)

N83-26482# Defence Technology and Procurement Group, Bern (Switzerland). Div. 11. Equipment.

PROTECTIVE CLOTHING AGAINST HEAT AND FIRE FOR TANK CREWS

R. LOSS /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 281-289 Jan 1983 refs

Avail: NTIS HC A18/MF A01

A profile of requirements for protective clothing for tank crews is presented. The profile considers protection, comfort, service life, handling, color, and cleaning. Methods for measuring the heat protection factor and flame resistance of materials are reviewed. Compromises between protective function and comfort are proposed.
Author (ESA)

N83-26483# Danish Defence Command, Copenhagen.

PROTECTION OF THE HANDS

L. VANGGAARD (Naval Medical Service, Vedbaek, Denmark) /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 291-296 Jan 1983

Avail: NTIS HC A18/MF A01

Temperature regulation in the hand is described. In the hands (and feet) arteriovenous anastomoses bypass the normal capillary system and shunt blood directly from the arteries to the superficial veins. The arteriovenous anastomoses close when deep body temperature falls below normal. Preservation of deep body temperature overrules the functional demands of hands and feet. Glove design problems posed by the need to maintain hand temperature while reducing sweating are discussed.
Author (ESA)

N83-26484# Bundesamt fuer Wehrtechnik und Beschaffung, Koblenz (West Germany).

A NEW FABRIC FOR PROTECTIVE CLOTHING

W. K. D. GEHRMANN /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 297-306 Jan. 1983

Avail: NTIS HC A18/MF A01

Aramid-viscose blends were tested in order to develop a flame retardant material. Technological data of blends consisting of varying percentages of the two components but with the same weave do not differ significantly. A 65% viscose - 35% aramid blend has similar mechanical properties to cotton fabrics but is cheaper, very comfortable and reduces static charge. There are no problems with finish application or dye.
Author (ESA)

N83-26485# Swedish Inst. for Textile Research, Gothenburg (Sweden).

EXPECTED DEVELOPMENT OF TEXTILE CLOTHING MATERIALS AND OF IMPROVED PROPERTIES IN BATTLE DRESSES

A. BERNSKIOELD /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 309-319 Jan. 1983

Avail: NTIS HC A18/MF A01

The wear, protective, comfort and maintenance properties of a warp satin fabric of cotton-polyester (50/50 mix) are summarized and the need to improve the quality of battle dress fabrics is considered. Fiber properties, functional efficiency, dyeing and fabric structural properties are discussed. Improvements in rain resistance, flame retardance, camouflage properties, and water vapor permeability are needed.
Author (ESA)

N83-26486# Swedish Inst. for Textile Research, Gothenburg (Sweden).

DECREASING THE NUMBER OF MILITARY GARMENT SIZES WITHOUT COMFORT DETERIORATION

M. CEDNAES /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 321-326 Jan. 1983

Avail: NTIS HC A18/MF A01

A 12-size system for work clothes is proposed. Control dimensions are stature and mass. Size labels are marked with two intervals, for example 174 to 182 cm and 70 to 80 kg. For extensible knitwear, underwear, etc., only a few sizes are needed, e.g., below 70 kg, 70 to 80 kg, above 80 kg.
Author (ESA)

N83-26487# Defence Materiel Administration, Stockholm (Sweden). Army Materiel Dept.

DEVELOPMENT OF PROTECTIVE CLOTHING BASED ON THE DEMANDS OF THE USER AND HIS ENVIRONMENT

E. ROSENBLAD-WALLIN /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 327-333 Jan 1983

Avail: NTIS HC A18/MF A01

Work clothes which give adequate protection against oil and dirt and which meet mechanical engineering industry movement, comfort, and maintenance criteria were developed. Environmental mapping determined clothing demands. Environmental and activity descriptions were transformed into demands on the functional properties of the clothes. The value-assigned functional properties were transformed into textile properties. Textile property demands governed material choice. Garment design was based on anatomical studies of movements involved in typical tasks such as lathe operation.
Author (ESA)

N83-26488# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.

THE NEED FOR COMPROMISE AND FREEZING OF SYSTEMS BEFORE PRESENTING ALTERNATIVES TO DECISION MAKERS

G. LOGAARD /In its Intern. Conf. on Protective Clothing Systems p 335-338 Jan. 1983

Avail: NTIS HC A18/MF A01

Problems caused for designers of military clothing and equipment by the conflicting demands of users, decision makers

and nonspecialistic who can influence decisions are reviewed. It is suggested that the designer should propose designs which are prohibitively expensive to change if he wants his ideas to be accepted. Author (ESA)

N83-26489# Defence Materiel Administration, Stockholm (Sweden). Army Materiel Dept.

POSSIBILITIES TO FULFILL MILITARY REQUIREMENTS IN AN ORDINARY PROTECTIVE CLOTHING SYSTEM

N E MELINDER /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 339-347 Jan. 1983 Avail: NTIS HC A18/MF A01

Factors which influence the design of combat clothing are discussed. The need to include activities dictated by the influence of the enemy in design criteria is stressed. An order of priority for satisfying design requirements: technical, economic, tactical, environmental, and human factors is proposed. Author (ESA)

N83-26490# Department of National Defence, Ottawa (Ontario) Clothing, General Engineering and Maintenance Dept

COMBAT CLOTHING IN THE 1985-2000 TIME FRAME

G. T HOLMES /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 349-370 Jan. 1983 refs Avail: NTIS HC A18/MF A01

A combat clothing design philosophy which combines protection against specific hazards by adding special items to the basic ensemble, and incorporating as much protection as possible in the basic ensemble is predicted for the period 1985 to 2000. Synthetic fibers with inherent coloring, which react to temperature changes, are phototropic, which are sheathed, and whose basic properties are modified by irradiation are advocated. Lamination of multicomponent fibers provides multise materials. Protection requirements for temperature, cold, and hot environments are listed. Author (ESA)

N83-26491# Finnish Defence Forces, Helsinki Quatermaster Section.

A SIMPLE MULTICRITERION METHOD FOR MILITARY CLOTHING EVALUATION

J. HAANTERAE /In Research Inst. of National Defence Intern. Conf. on Protective Clothing Systems p 371-381 Jan. 1983 Avail: NTIS HC A18/MF A01

A comparison point system based on the applied mathematics alphabet is proposed for evaluating separate clothing items and ensembles. Criterion groups are divided into first degree headlines, these into second degree headlines, and these to final questions. Research and trial results are translated into estimate ratings ranging from 1 to 10 according to the military scale of efficiency. The evaluating points are derived by multiplying: general staff coefficient x-subdivision coefficient x-estimate rating = evaluating points. Conclusions are drawn by comparing separate evaluation points, the sums of headlines and criterion groups and those of total points. Evaluations of three basic battle dresses are presented. Author (ESA)

N83-26492# Massachusetts Inst. of Tech., Cambridge Man-Machine Systems Lab

FAILURE DETECTION AND LOCATION METHOD (FDLM) Ph.D. Thesis, Jan. 1981 - 30 Sep. 1982

U. TSACH 30 Sep 1982 173 p refs

(Contract N00014-77-C-0256)

(AD-A123783) Avail: NTIS HC A08/MF A01 CSCL 05H

The computerized method developed in this thesis aids the operators of complex dynamic systems to detect failures and to locate the causes in real-time. This method is called Failure Detection and Location Method (FDLM). Failures are detected when the differences between the measured system's power variables and their corresponding calculated model values are outside preset limits. The causes are located by disaggregating the model and utilizing the causal description of the resultant submodels. This method eliminates the necessity to preprogram the system's possible failure modes, but requires an efficient failure location

procedure. System, sensor, and control input failures can be identified by FDLM. The display interfacing FDLM to the human operator was designed to minimize the rate of missings and false alarms as well as the operator's reaction time. A simulation test of FDLM applied to a part of a ship's engine demonstrates the advantages of the method. Author (GRA)

N83-26493# Federal Aviation Administration, Washington, D C Office of Aviation Medicine.

PERFORMANCE OF 40- TO 50-YEAR-OLD SUBJECTS ON A RADAR MONITORING TASK: THE EFFECTS OF WEARING BIFOCAL GLASSES AND INTERPOLATED REST PERIODS ON TARGET DETECTION TIME

R. I THACKRAY and R. M. TOUCHSTONE Apr. 1982 14 p refs

(AD-A123843, FAA-AM-82-16) Avail: NTIS HC A02/MF A01 CSCL 05E

The present study examines the effects of wearing bifocal glasses and interpolated rest periods on the performance of 40 to 50 year old subjects on a radar monitoring task. The visual display was designed to resemble an air traffic control radar display containing computer-generated alphanumeric symbols. Forty men and women were divided into four equal-sized groups, with each group consisting of one of the four possible combinations of bifocal/no-bifocal and rest/no-rest conditions. All subjects were tested over a 2-hour session. Rest periods (a 5-minute break every 30 minutes) significantly reduced the performance decrement of 40 to 50 year old subjects, bringing performance to a level approximating that of 18 to 29 year old subjects without rest periods. The wearing of bifocal glasses did not contribute to visual strain or somatic discomfort. GRA

N83-26494*# National Academy of Sciences - National Research Council, Washington, D C. Committee on Aircrew-Vehicle System Interaction.

AIRCREW-VEHICLE SYSTEM INTERACTION. AN EVALUATION OF NASA'S PROGRAM IN HUMAN FACTORS RESEARCH Final Report

Oct. 1982 39 p refs

(Contract NASW-3455)

(PB83-140590; NASA-CR-172662; NAS 1.26:172662) Avail:

NTIS HC A03/MF A01 CSCL 01C

The review comprises an assessment of NASA's program in the study of human factors in aircraft flight management and evaluates an augmentation to the program proposed by NASA. NASA's goal is to improve the existing knowledge base of factors that tend to introduce human error. The committee concludes that NASA's effort should be concentrated on developing methods and techniques for analyzing man machine interactions, including human workload and prediction of performance and assessment of their effects on safety and reliability. GRA

N83-27599# Naval Weapons Center, China Lake, Calif. HUMAN INFORMATION PROCESSING GUIDELINES FOR DECISION-AIDING DISPLAYS

M. J. BARNES Dec. 1981 44 p refs

(AD-A124858; NWC-TM-4605) Avail: NTIS HC A03/MF A01 CSCL 05H

Decision-aiding is one means of alleviating the high workload and time constraints typical of combat situations. The purpose of a decision-aid is to reduce the operator's information processing load while structuring the problem so that the operator can make the final choice. As opposed to automation, the operator is not replaced in the decision loop, instead he is freed from complex computational, memorial and processing requirements allowing him to concentrate on the consequences of the action he selects. This report is the result of a literature search of human information processing research. The purpose was to provide baseline data from which decision-aid design guidelines could be developed. A decision aid does not replace the operator but rather interacts with the operator as part of a decision-making system therefore some indication of how the human processes and remembers information is necessary in order to design such an aid. The general

outline of the report will consist of two major areas: (1) human memory systems and (2) human processing systems. GRA

N83-27600# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.

QUATERNIONS IN COMPUTER VISION AND ROBOTICS

E. PERVIN and J. A. WEBB 1982 17 p refs
(Contract F33615-78-C-1551; ARPA ORDER 3597)
(AD-A125876, CMU-CS-82-150) Avail: NTIS HC A02/MF A01
CSCL 12A

Computer vision and robotics suffer from not having good tools for manipulating three-dimensional objects. Vectors, coordinate geometry, and trigonometry all have deficiencies. Quaternions can be used to solve many of these problems. Many properties of quaternions that are relevant to computer vision and robotics are developed. Examples are given showing how quaternions can be used to simplify derivations in computer vision and robotics.

Author

N83-27601# Los Alamos Scientific Lab., N. Mex.

EVALUATION AND PERFORMANCE OF CLOSED-CIRCUIT BREATHING APPARATUS

A HACK, A TRUJILLO, O D. BRADLEY, and K CARTER Apr 1982 22 p refs
(Contract W-7405-ENG-36)
(DE82-015877; NUREG/CR-2652; LA-9266-MS) Avail: NTIS HC A02/MF A01

Seven closed circuit self contained breathing apparatus were worn by a panel of anthropometrically selected test subjects to determine the protection provided by each. The types included those that supply breathing gas continuously, or on demand, or a combination of both. One unit maintained a positive pressure and provided higher protection than the others. Device performance by facial size is discussed. DOE

N83-27602# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho Operational Safety Div.

OPERATIONAL READINESS AND THE HUMAN FACTORS ENVIRONMENT

L. R. KLINESTIVER 1982 5 p refs Presented at the SAFF Symp., Las Vegas, Nev., 5 Dec 1982
(Contract DE-AC07-76ID-01570)
(DE83-005586, EGG-M-22082; CONF-821225-1) Avail: NTIS HC A02/MF A01

Personnel readiness as it applies to hardware, procedures, and management controls is defined. Task performance factors and interface factors that affect operational organizations and developmental programs are presented. Operational readiness, as far as personnel are concerned in the industrial and aerospace industry, is affected by human factors such as physiological, psychological, and environmental. Plant hardware, procedures, and management control are also indirectly involved. DOE

N83-27603# Lulea Univ. (Sweden). Dept. of Human Work Sciences.

THE VDU OPERATORS' PREFERRED ENVIRONMENTAL CONDITIONS IN A TELEPHONE INFORMATION CENTER

H SHAHNAVAZ 1982 34 p refs Sponsored by Swedish Telephone Co.
(TULEA-1982-11; ISSN-0347-0881) Avail: NTIS HC A03/MF A01

Environmental conditions such as lighting, workplace dimensions, and factors related to the visual display units were measured during day and night shifts for 28 operators at a telephone information center. A universal photometer, a photometer-radiometer, and an automatic spectroradiometer were used for light measurement. Results of the survey show that the operators in general prefer much lower luminance and or work place illuminance than previously reported. Large inter-individual differences in screen and workplace lighting adjustment were also revealed. Author (ESA)

PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

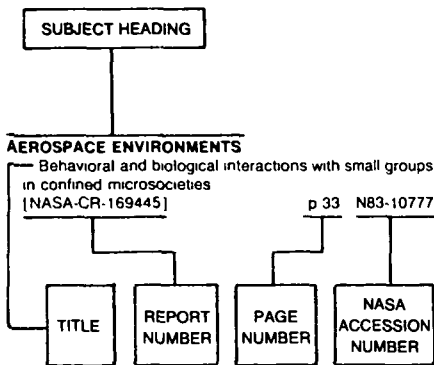
A83-34549

ON THE OPTICAL PROPERTIES OF BACTERIAL GRAINS - I.

N. L. JABIR, F. HOYLE (University College, Cardiff, Wales), and N. C. WICKRAMASINGHE (Institute of Fundamental Studies, Colombo, Sri Lanka, University College, Cardiff, Wales) Astrophysics and Space Science (ISSN 0004-640X), vol. 91, no. 2, April 1983, p. 327-344. refs

The detailed optical properties over the waveband 0.8-10/micron are computed for the bacterial grain model by Hoyle et al. (1979, 1981, 1982). A model comprised of three biologically derived components, modified under interstellar conditions, is shown to be in close correspondence with the observed properties of interstellar dust. Data on interstellar extinction and polarization may be accounted for by this model. Author

Typical Subject Index Listing



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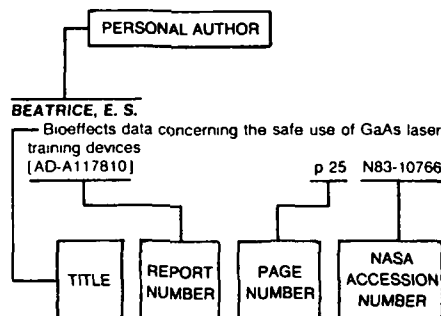
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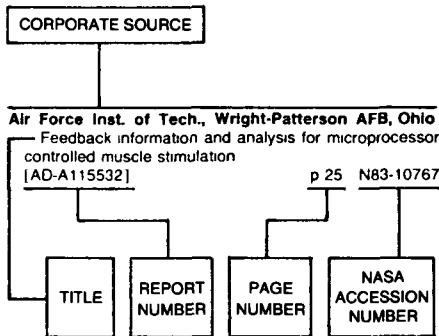
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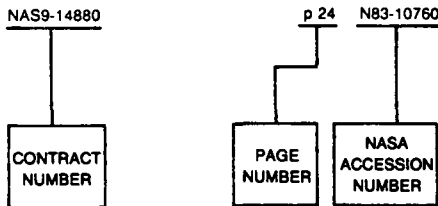
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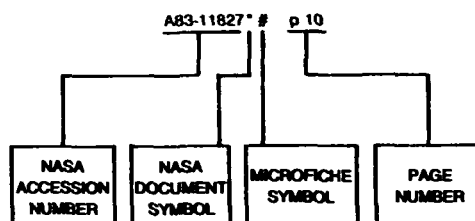
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